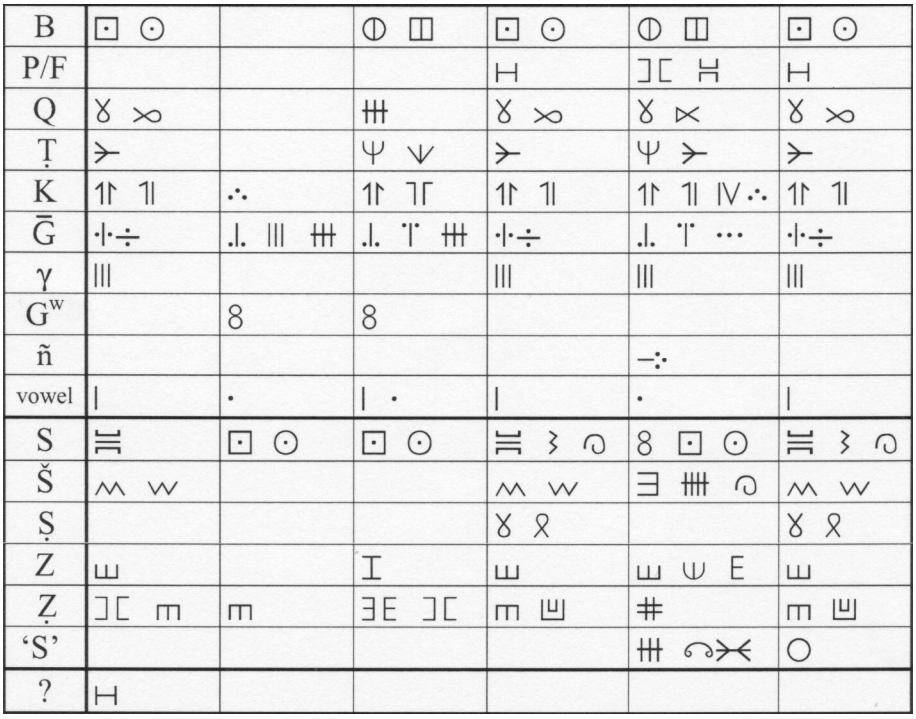
CORRIGENDA

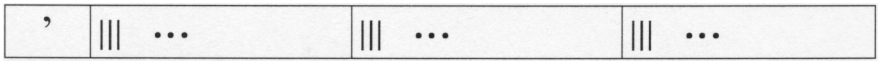
p. 45, Fig. 22.

normal form	round variants	acute angled variants
⊏	⊂	〈
⊐	⊃	〉
⊓	∩	∧
⊔	∪	∨
⋓	⋒	W ⩛
⋿	⋒	⩚
E		≨
∃		≩
⧖	⧗	
⧖	⨷	
⋉	∝	
⋊	∞	
N	∾	
И	∽	
Σ	S	
Z	ƨ	
⅂	⅁	⅄
⌐	⌐	⌐
⧖	8	
⋈	∞	
□	○	
⊡	⊙	

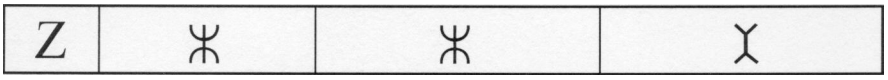
p. 81, Fig. 52.



p. 91, Fig. 62.



p. 94, Fig. 65.



BERBER STUDIES

ISSN 1618-1425

Volume 15

Edited by

Harry Stroomer
University of Leiden / The Netherlands

Werner Pichler

Origin and Development of the Libyco-Berber Script

RÜDIGER KÖPPE VERLAG · KÖLN

The series *Berber Studies* is a linguistic and text oriented series set up to enrich our knowledge of Berber languages and dialects in general. It is a forum for data-oriented studies of Berber languages, which may include lexical studies, grammatical descriptions, text collections, diachronic and comparative studies, language contact studies as well as studies on specific aspects of the structure of Berber languages. The series will appear at irregular intervals and will comprise monographs and collections of papers.

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at http://dnb.d-nb.de.

ISBN 978-3-89645-394-5
ISSN 1618-1425

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RÜDIGER KÖPPE VERLAG
P.O. Box 45 06 43
50881 Cologne
Germany

www.koeppe.de

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Published with financial support from *Het Oosters Instituut*,
Leiden / The Netherlands

Cover: Inscriptions, see p. 87, taken from Gauthier 2003, figure 4

Production: Klever GmbH, Bergisch Gladbach / Germany

♾ Printed on acid-free paper which falls within the guidelines of the ANSI to ensure permanence and durability.

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Foreword

The phrase « Libyco-Berber script » requires a few comments. It refers to a kind of geometrical script which has been used for centuries in North African, Saharian and Canarian inscriptions, and is still popular among the Twaregs. Moreover, its revival is currently advocated by Berber circles, in countries like Morocco from where it had completely disappeared. It first drew the attention of European scholars in 1631, when an inscription, written in two languages, was discovered on the now famous mausoleum at Dougga (Tunisia). One of the languages is Punic, the other one is called Libyan, after the name « Libya » given to Africa by the ancient Greeks (French « libyque » is distinct from « libyen », which alludes to modern Libya). Later on, a number of inscriptions exhibiting the same kind of writing, most of them on funeral steles, were to be found in Tunisia and elsewhere in North Africa, but a correct identification and study remained impossible until the XIXth century, when, on the one hand, the knowledge of Punic improved and, on the other hand, the Libyan script was shown to be akin to the Twareg system of writing. The name « Libyco-Berber » thus refers to both types of documents, ancient and modern. All of them are found in the geographical area where Berber (or a related language) is or was spoken. Needless to say, the use of that script on such a spatial and temporal scale could not but result in its splitting into several alphabets, complying with the same principles, but differing in the shape and phonetic value of some letters.

As the first Libyco-Berber inscriptions to be discovered were associated with Punic or Roman ruins, most of the studies, until a recent date, have focused on the ancient monuments. Many attempts were made to translate them, but much remains to be done in that respect. It has been possible, though, to shed light on the alphabet used at Dougga and to link a few Libyan words, admittedly representing a former stage of the Berber language, to modern elements. On the contrary rock inscriptions, parts of which were written long before classical antiquity, did not receive the attention they deserve. The reason is that the older ones resist deciphering, whereas the more recent Twareg documents were often considered as vulgar graffiti, repetitive and deprived of real interest. However this is unfair, because even humble texts may yield precious information not only on the alphabets and the writing system, but also on individual or ethnic names, recurrent formulae, nomadism, etc. But the situation has somewhat improved in that respect, thanks to a better understanding of what could be learned from a systematic collection of the inscriptions. Furthermore the fact that a Libyco-Berber script has

existed since remote ages is rightly emphasized by those Berber-speakers who struggle to assert their cultural identity. The origin of such a script had already been investigated in the past, but the problem has now gained a new significance and is sometimes tackled by authors whose enthusiasm may lead further than strict evidence should allow. At this point Werner Pichler's book arrives at the right time.

The author is not a new-comer in the field. An active member of the Institutum Canarium, he has long had a concern in the past of the Canarian archipelago. He is known to have thoroughly studied a lot of rock inscriptions in the eastern islands Lanzarote and Fuerteventura, the script of which he related with the Latin cursive exemplified at Pompei, even if the language is not Latin. At the same time he investigated the numerous inscriptions which show that the Libyco-Berber script was in use as far as these islands. Thence he turned his attention to the continent and had the opportunity to do field-work in the south of Morocco.

The first part of the book provides the reader with a critical survey of the various opinions which were set forth on the Libyco-Berber script since the XIXth century, with particular reference to its origin. This reminder will prove the more useful as ancient and nevertheless valuable publications are too easily forgotten. It includes even « extraordinary theories » and may serve as a warning to scholars quick to indulge in romantic ideas.

The following chapters develop the author's opinion on the two chief topics of the book: where does the Libyco-Berber script originate from? And how did it develop? Whether the answers will meet general approval is doubtful, because at first sight they diverge from the most common theories. Like some previous researchers, though, Pichler thinks that both the idea of writing and the alphabet were first brought to North Africa by the Phoenicians, between the Xth and the VIIth centuries BC. But according to him the new techniques did not spread westwards along a continental road: rather, the process started from the south of Spain and reached Morocco through the straits of Gibraltar, before expanding eastwards. It will be objected that the number of inscriptions in Morocco is not as high as should be expected from the presumed cradle of writing, but the author argues that the development of the script had to keep pace with the social and cultural progress which eventually led to the « classical » documents at the time of the Numidian kings. The necessary adjustment of the script to the local language resulted in new characters being added to the Phoenician ones. On the whole Pichler holds that the Libyco-Berber script is the outcome of a systematic process of creation aiming both at economy and aesthetics.

Objections are easily foreseen. I leave it for the historians to discuss the problem of chronology, not forgetting, though, that Pichler's proposals look as credible as the extremely remote dates which are sometimes put forward. The presence of a few ancient Phoenician (not Punic!) letters in Libyco-Berber inscriptions may be acknowledged too. I confess that I am more reluctant to admit a wholly rational and thoroughly calculated type of script, but it is only fair to recall that in some instances a systematic correspondence between the shape of the letters and their phonetic value has been pointed out.
At any rate Pichler's methodical investigations and original opinions, together with the amount of information he brings out, make his book a well-timed and stimulating one.

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Member of the Royal Netherlands Academy of Arts and Sciences

Introduction

There are two writing systems that are indigenous to North Africa: firstly, the writing system of Old Egypt with its specific variants, and secondly the script of the ancient Berber people. This book focuses on the latter.
In the first chapter I present — to a great extent, without offering any comments — the widely differing opinions on the origin of this script, which have been published by a number of authors over the last 150 years.
The second chapter of my book deals with the central questions of when and where this script originated. As a result of my own investigations in the western part of the Libyco-Berber territory (Canary Islands, Morocco) I propose new thoughts that combine elements of previous ideas in order to come to a more coherent and more plausible construct.
In the third chapter I try to establish a theoretical system underlying the LB-script, based upon principles of the economy and aesthetics of writing.
The fourth and main chapter of this book is dedicated to the historical evolution of the script from the reconstructed proto-alphabet to the recently created Neo-Tifinagh.
Some of the conclusions of my investigations contradict apparently well-established doctrines.
It is perhaps interesting to keep in mind that the Romans, for whom literacy was a main characteristic of civilized cultures, used to call non-literate peoples "barbarians" (=Berber). But we should not forget that it was these same "barbarians" who created their own script at the same time as the Romans were borrowing their script from the Etruscans (700 – 600 BC), or perhaps even a little bit earlier. Why did the "highly civilized" citizens of the Roman Empire display such arrogance towards their "wild" Berber neighbours in North Africa?

Terminology

In the course of more than 150 years of research various labels have been used, not in every case exactly defined and thus often leading to misunderstandings. Therefore, I shall preface this book with an attempt towards a system of classification as coherent as possible.

Libyco-Berber script (following Galand's term "écriture de type libyco-berbère" 1993:123): collective term for the whole group of scripts from ancient Libyc (formally also called Numidic) till recent Tifinagh.

Libyc script: collective term for a series of ancient alphabets used all over the territory of North Africa from the Canary Islands to Libya (or even Egypt?), probably for writing various ancient languages.

Tifinagh (or: tifinar): in contrast to the usual practice of nearly all publications about North African rock art (where it is used generally for all types of inscriptions) Tifinagh is the correct term only for "modern" inscriptions, written in the Twareg language, legible for today's Twaregs.

As far as possible I distinguish between terms for languages/scripts (ending with -ic) and terms for peoples/cultures (ending with -ian, -aean etc.): e.g. Libyc, Numidic etc. for languages/scripts. Libyan, Numidian for peoples/cultures.

Abbreviations

AARS	Association des Amis de l'Art Rupestre Saharien
Afus D.W.	Association Afus Deg Wfus (Roubaix)
FWF	Fonds zur Förderung der wissenschaftlichen Forschung
IAM	Inscriptions antiques du Maroc (Galand 1966)
IC	Institutum Canarium
LB	Libyco-Berber
ONA	Oasis North Arabian
OP	Old Phoenician
RAR	Rock Art Research
RIL	Recueil des inscriptions Libyques (Chabot 1940)
RILB	Répertoire des inscriptions Libyco-Berbères

Acknowledgements

Much of the extensive fieldwork necessary for the achievement of this publication was made possible by the support of the Austrian FWF.
My interest in this very special subject was aroused by Herbert Nowak and a series of discussions at the annual meetings of INSTITUTUM CANARIUM.
To Lionel Galand I am indebted for nearly fifteen years of scientific support with a never-failing flow of critical comments, corrections and suggestions.
Regarding the photos from sites that I was not able to visit myself, I have been greatly helped by Rüdiger Lutz, Jörg Hansen, Yves Gauthier, Christian Dupuy, François Soleilhavoup, Giancarlo Negro, Mansour Ghaki and Erwin M. Ruprechtsberger.
My overview over the huge LB territory surely would be even better if some French and Spanish colleagues had not refused to contribute their photos.
My viewpoints and my knowledge have profited considerably from conversations and correspondence with dozens of colleagues, among whom I would like to mention Alain Rodrigue, Yves Gauthier, Jürgen Untermann and Alfred Muzzolini (†).
My thanks also for those colleagues who gave me permission to draw inscriptions on the basis of photographs: details see appendix II.
I am very grateful to Helen Knox for correcting my faulty English.
Last but not least this book would not have been possible without the sympathy and cooperation of my wife Lucia who accompanied me to nearly all sites and took part in the field work.
Of course I retain all responsibilities for flows and inaccuracies in this work.

1. History of research

L'origine de l'alphabet libyque
pose des problèmes insolubles.
Camps

Although the monumental inscriptions at Dougga were discovered in 1631 it lasted till the middle of the nineteenth century, when the question on the subject of the origin of this script was asked for the first time. Since then more than forty authors have devoted their attention to this subject. In the following chapter I am not going to present a chronological course of investigation but a thematic grouping according to the different positions of the authors.

1.1 Extraordinary theories

In 1832 *Rafinesque* claimed that the LB characters are analogous to the Mayan glyphs when they are broken down into their "essential parts" – whatever that may mean (cited in Winters 1983).
In 1847 *Schmeller* – professor at Munich – evolved in connection with the discovery of an inscribed stone in the heart of North America, whose letters were interpreted as Runic, the theory that the Numidic script was brought to North Africa by the Vandals in AD 429. With the Normans this script reached North America during the tenth century. Apart from the fact that the LB script existed – as has been proved – long time before AD 429 in Africa, Blau already pointed out in 1851 that it is impossible to infer from the similarity of some simple signs to the relationship or identity of two systems of writing.
Totally independent of this, *Fell* – a marine biologist at Harvard University – propagated a similar theory in the seventies of the last century. He believed to recognize Tifinagh script among Scandinavian rock art as well as on rock art panels at Peterborough/Canada. He held the opinion that the Norwegians brought this script to North Africa, but in much earlier times: about 1700 BC! He deduced this dating from stellar maps, which, in his opinion, can be found on the same rock panels. Fell presumed alternatively Arabic, Iberian and Egyptian (which in his mind is identical to the ancient Libyc) as the languages of these "inscriptions" – mainly consisting of cup marks. In contrast to Schmeller, whose theory had no direct consequences, Fell succeeded in gathering a fanatic group of fans around him. They organized themselves in the "Epigraphic Society", published series of papers and books and finally resulted in the assertion

that thirteen ancient scripts are represented on rock art panels in North America.
Even the highly respected Canadian scholar *Kelley* – who had participated essentially in the decoding of the Maya-script – partly joined Fell's ideas. For him the origin of the alphabet could be found in Bronze Age Scandinavia and from there the script "somehow" reached North Africa and America. He dated the "inscriptions" of Peterborough to between c. 1000 and 700 BC.
Fell's theory is still surpassed by far by the amateur-researcher *Knauer*, a German lawyer. In his book "Schalensteine als Schriftträger" (1990) he transferred the origin of Tifinagh script to the caves of Southwest-France and dated it to between c. 30.000 and 16.000 BC! From there the script came to Scandinavia, Ireland and Scotland: all regions where stones with cup marks were found. Already in the early Bronze Age the Scandinavians took over the script to North America (Peterborough). By c. 1200 BC the "Peoples of the Sea" transferred the Tifinagh script to North Africa. Knauers own attempts of transcription are based on the Latin (!) language.
Similar to Knauer – but about sixty years earlier – *Gattefosse* (1934) transferred the origin of the LB script to the Neolithic Age. He conceded the original script only ten letters, which can be deduced from Neolithic buildings: | = menhir, || = two menhirs, ⊓ = dolmen etc.
The British explorer *Harding King* – after having seen some inscribed stones in northern Africa – made a comment to the effect that the script is "neither more or less than Greek" (1903:319).
Cornelius (1954) assumed the origin of many LB signs from the Indus Valley script, Linear A and from Egyptian pottery signs.
Delgado dealt with the genesis of LB script in his book "Inscripciones líbicas de Canarias" (1964) in a separate chapter. Based upon the correct observation that the turn of signs can change their meaning he believed in a derivation from the Ugaritic cuneiform script. Thus Delgado sharply conflicts with the common school of thought, that the Ugaritic script had no influence upon other scripts. Soon after the invention of the consonantal alphabet the cuneiform script ossified and became extinct (Földes-Papp 1966:99, Haarmann 1990:381). In addition an exact analysis shows that Delgado reproduced some Ugaritic signs in a wrong way and thus enlarged the number of similar signs. In the Meroitic Newsletters 7/1971 and 9/1972 a discussion between Galand and *Zawadowsky* about the latter's thesis of a "contamination" between the Meroitic alphabet and the LB script can be found. Zawadowsky postulated the identity of nine signs with regard to their form and

phonetic value, Galand proved to be not really convinced of such correlations.
For *Winters* (1983) the LB signs were analogous to the Mande signs. He felt able to decipher the Mertoutek Oued inscriptions as a syllabic script originating from c. 3.000 BC.
In his book about the connections between the copper mining and the rock art of the Anti-Atlas *Letan* (2003:50ff) reflected about a possible connection of the LB script with Nordic runes. His assertion of an identity of 14 LB signs with runic ones must be firmly rejected.
In 2004 *Slaouti Taklit* – teaching linguistics at the university of Algier – turned the traditional idea of an evolution of writing on its head: the Phoenician script – and thus naturally the Latin and Greek scripts too – can be derived from the LB script!

1.2 South-Semitic origin

A considerable number of scholars favoured the family of Arabian scripts as the origin of the LB script. It would be beyond the scope of this book to discuss every detail of these attempts of derivation. I will confine myself to a short synopsis.
Blau (1851) attested the LB script an age *"appreciable older than the third century BC"*. He emphasised a series of correspondences with signs of the Himyaritic alphabet, which belongs to the South-Arabian family of scripts.
A greater part of scholars favoured the North-Arabian branch of this family. The first one to mention the – at this time so called – "Thamudic" script was *Littmann* in 1904. The disadvantage of his thesis is that he needed the Sabaic and Safaitic alphabet in addition to complete his derivation of signs.
In 1979 *Rössler* reminded of the ingenious, but forgotten paper of Littman and summarized: "*Diese Schrift muß den Libyern zu einem nicht näher bestimmbaren Zeitpunkt und unter nicht näher bekannten Umständen von alten Nordarabern (Thamud oder Verwandten) übermittelt worden sein*" (1979:93).
Mukarowski (1981) agreed with Littmann and Rössler in their main statements about the Arabian roots, but claimed an influence of the Phoenician script too.
Lemaire considered it to be possible that the evolution of the LB script was *"provoquée par un contact avec l'écriture thamoudéenne quelque part à l'ouest du Nil"* (Lemaire; Negro 2000:174).

1.3 North-Semitic origin

This family of Semitic alphabets unites the greatest number of scholars searching for the origin of the LB script. To be precise, all of them plead for a descent from the Phoenician script (including its younger Punic variant).
In 1874 *Halevy* has already presented a very plausible comparison of both alphabets, even if I do not agree with him in some details.

A short selection of quotations:
"L'écriture libyque est empruntée aux Phéniciens" (Halevy 1874:85).
"Man wird ja nicht im Zweifel sein, dass die libysche Schrift von der Buchstabenschrift derPhönizier abhängt" (Meinhof 1931:43).
"The Libyans borrowed from the Phoenicians a few letters and the idea of writing" (*Bates* 1970:86).
"L'hypothèse d'une origine phénicienne est renforcée non seulement par la forme similaire de 6 lettres, mais aussi par le nom de l'alphabet : Tifinagh" (Prasse 1972:146).
"L'alphabet libyco-berbère (...) est très certainement d'origine phénicienne" (Chaker 1984:247).
"Das libysche Alphabet ist ein Ableger des phönizischen" (Untermann 1997:49).
"Berberisch wurde in einer vom Phönizischen abgeleiteten Schrift geschrieben" (Iliffe 1997:47)
A typical advocate of the Punic thesis was *Février*: *"L'alphabet libyque a été constitué sous l'influence visible de l'écriture punique à une époque assez tardive, au –III^{e} et au –II^{e} siècle"* (1959:327).
"The ancient Berber script is based on and derived from a Semitic prototype, probably Punic" (O'Connor 1996).
This often published thesis of a Punic origin is, in my opinion, totally incomprehensible: the extraordinary cursory signs of Punic script really show no similarity to the extraordinary geometric signs of LB script. As will be shown later on, this deduction is impossible for historical reasons, too.

1.4 Own invention

The last group of scholars could imagine that the Libyan people were able to create an own script and nearly all of them can imagine that this was provoked by the contact with the Phoenician/Punic script.

The only one who attributes this creation to King Massinissa was *Meltzer* in his "Geschichte der Karthager" (cited in Camps 1978:144).
Meinhof could imagine early contacts with the OP script: *"Wenn man bedenkt, in wie früher Zeit libysche Stämme nach Ägypten gekommen sind, wo sie Gelegenheit hatten, ägyptische und altarabische Schreibweise kennen zu lernen, wird es nicht außer des Bereiches der Möglichkeit sein, daß ein intelligenter Libyer eine Schriftart für seine Muttersprache erfand"* (1931:45).
Friedrich wrote that the script *"von den Semiten (und dann wohl am ungezwungensten von den benachbarten Puniern und nicht von Arabern) beeinflusst ist, im übrigen aber sich selbständig entwickelt hat"* (1937:338f).
Tovar cited Gómez-Moreno, who claimed for the Iberian and Tartessian script roots older than the Phoenician and concluded: *"No es ninguna manera imposible que en la constitución de un alfabeto tan original y extraño como el líbico, haya que tener presentes precedentes de tan remota antigüedad"* (1944/45:76).
Jensen (1958) found Meinhof's and Friedrich's theses the most probable ones, deciding for the OP variant, against *Haarmann* (1990) who also wrote about a Libyan creator but decided for the Old Punic script.
There are only few scholars who reflected about details of the act of creation: what was the innovation in addition to the Phoenician example?
Bates was the first to suppose that *"a number of simple marks (marks of identification, owner marks), of a type widely diffused, were pressed into service to make up the complement of letters to form the alphabet"* (1970:86).
Already seventy years earlier *Lidzbarski* wrote about the role of Arabian tribal marks (wusum) and contradicted Littmann: *"Die Wusum sind nicht entlehnte Alphabetzeichen, sondern die altarabische Schrift hat ihre Form unter dem Einfluß der Wusum erhalten"* (1902:362)
Galand, who commented on the subject in a series of publications (1991, 1996a, 2001c), took the same line as Bates:*"Je pense donc que les matériaux libyques ont, pour le plupart, été créés en Afrique où, du reste, on les retrouve souvent dans des emplois variés, tatouages, décoration de poteries, marques d'animaux"* (2001:22).
Kossmann (1999:17) followed Galand in writing that the Lybic script is *"une écriture qui – quoique probablement dérivée de l'écriture phénicienne – est bien originelle"*.
In 2000 *Chaker* and *Hachi* published a critical reflection of a linguist and a pre-historian about the "classic" thesis of a Phoenician/Punic origin. They tried to refute six main points of the argumentation pro Phoenician:

1. The chronology: the oldest LB inscriptions are younger than the implantation of the Phoenician culture in North Africa, so the script was taken over by the Berber people in the centuries after the arrival of the Phoenicians.
Counterargument: Chaker/Hachi refer to the inscription of Azib n'Ikkis to which they assign the same style and patina as the surrounding representations of human beings and weapons – that means Bronze II (at least c. 500 BC). They cannot imagine a Carthaginian/Punic influence at that time.
2. The geography: the great majority of LB inscriptions can be found in the area of great Punic influence.
Counterargument: as the High Atlas is situated so far away from Carthage, so continental and so mountainous it is very improbable that this region should have been influenced by Carthage.
3. The history and development of the script: the Berber people could not have developed an own script because there was no pre-alphabetic system of writing in this area.
Counterargument: during the Caballine period a process of geometric schematisation was under way which resulted in a great repertoire of signs and symbols used for tattoos, motifs on pottery, tapestry, tribal marks, animal brands etc. These were the precursors of alphabetic script.
4. The formal similarity: a considerable number of identical or similar signs are found in various Semitic alphabets (2–7 characters dependant on the selected alphabet).
Counterargument: the similarities in comparison with ancient Semitic scripts are minimal (two are sure, additional two are probable), the simple geometric signs are known all over the Mediterranean, Punic and Neo-Punic scripts show no similarity at all, the general style and the direction of writing are totally different.
5. The consonantal principle is an essential feature of Semitic scripts.
This argument is attested by Chaker/Hachi to be the strongest one for a Semitic influence. It is hardly conceivable that the Berber people should have invented this principle for themselves as it creates so many problems for reading the script.
6. The term "Tifinagh" and the words for "writing" and "script": Chaker/Hachi call into question the traditional derivation of "Tifinagh" from "FNQ" = "Phoenician" and refer to Galands classification of "aru" = "to write" and "tirra" = "script" as ancient and Pan-Berber words.
As a *"provisional conclusion"* Chaker/Hachi concede the possibility of a Phoenician/Punic influence in the case of the consonantal principle and a small number of characters. On the other hand they approve an

indigenous origin of the greater number of signs from the geometric art of Berber pre- and proto-history.

Muzzolini (2001) paid tribute to this *"detailed, competent and courageous paper"* by an extensive review. For him only the refusal of the Punic thesis was convincing but not the refusal of the Phoenician thesis. Being a rock art specialist he argued against the indigenous origin of the LB signs. He was not able to recognize signs from the Caballine period which could be precursors of the alphabetic script. For Muzzolini script occurs contemporary with the beginning of the Camel period and represents the supply of a "foreign world" of iconic representations of carts, spears, shields etc. – but some centuries later. Exactly these representations of carts from the Caballine period suggest a clear connection to the Cyrenaica. Muzzolini's surprising conclusion is that of a possible Greek origin of the LB script.

Hachid (2000) favoured – like Chaker/Hachi – a development of the LB script from the Proto-Berber geometric motifs in the time between c. 1300 and 1200 BC, but assuming that the oldest inscriptions occur not in the Atlas but in the Tassili and Tadrart.

In 2003 *Skounti/Lemjidi/Nami* published a book with the totally misleading title "Tirra. Aux origines de l'écriture au Maroc". The only comment in this book of 223 pages, concerning the subject is limited to the sentence: *"La problématique de l'origine de l'écriture au Maroc reste un domaine pratiquement vierge"* (2003:46).

2. The invention of the Libyco-Berber script

2.1 The origin

To avoid misunderstandings, one must start with a precise definition: the invention of script in the strict sense of the term means the invention of the "idea of writing". This extraordinary act of creation took place only on a few occasions in the history of mankind, and in regions where agriculture was developed in very early times: in Sumer (3000 BC) and in Central America (600 BC), probably also in Egypt (3000 BC) and China (1300 BC). Our knowledge of this topic is of course – as in all special fields – dependent on the present state of research. Nowadays, research on the time and place of the first invention of script is still in progress. During the past decade we have been confronted by a series of sensational new findings that might change certain aspects of our doctrines or even disprove them entirely:

- Egyptian hieroglyphs – 3300 BC
- Indus-script in Pakistan – 3500 BC
- "Proto-script" in Greece – 5300 BC
- "Ceremonial script" in Old-Europe – 5300 BC.

It would appear that a contest has begun among certain scholars to find older and older inscriptions. For the time being, all of these reports should be approached with great caution: their complete documentation, publication and scientific evaluation are still awaited. Some of the sensational news recently reported has even been proved to be false.

However, it is safe to say that the LB script is not one of the very few scripts credited with inventing the "idea of writing". With the exception of some modern script inventions (like the Cree- or Dene scripts for the Indian tribes), scripts always derive from earlier examples. With the creation of a new alphabet, in most cases the type of the script and some of the characters are borrowed. There are many reasons for adaptations and innovations:

- another language with a slightly different phonetic system
- a trend to simplify characters
- adaptation to a new writing implement/material etc.

According to Diamond (2000), there is a wide range of possibilities for such adaptations, which move between two extremes:

- blueprint: the older model is copied in detail
- diffusion of ideas: only the essential ideas of script are borrowed, new details are added.

In the case of the LB script our task is, therefore, to find out which advanced civilization's script is its possible origin, as well as to discover the paths of spatial and temporal distribution.

The determined place of origin should be beyond question. Among the places of original invention cited above, only Mesopotamia can be considered. Egypt is, of course, somewhat nearer, but the very sophisticated and elitist hieroglyphic script never had a significant influence upon neighbouring cultures. By the beginning of the second millennium BC the idea of script had reached the coast of the Mediterranean (e.g. Byblos). In about c. 1700 BC, we find examples of early script throughout the whole area between Syria and the Sinai Peninsula: Proto-Phoenician, Proto-Canaanitic, Proto-Sinaitic. In the following centuries, Semitic peoples developed a new type of script with distinguishing features:

- restriction to signs for consonants
- arrangement in strict sequence (= alphabet)
- naming of the signs according to objects with denominations starting with the respective sign (A: aleph = ox, B: beth = house etc.)

A series of theories exists concerning the complex course of events in the multicultural melting pot of the Near East, which led to the ingenious idea of the Phoenician alphabetical script. Haarmann (1990:200) has summarized the present state of research very well: *"Da es verschiedene Entwicklungen von Buchstabenschriften im syrisch-palästinischen Gebiet gegeben hat, die teilweise zeitlich parallel liefen, in bestimmten Fällen auch in enger chronologischer Abfolge standen, ist die Annahme einer "Erfindung" durch eine Einzelperson ganz unwahrscheinlich. Wer immer aber die anonymen Initiatoren der Konsonantenalphabete gewesen sein mögen, und wer auch immer an deren kontinuierlicher Tradierung beteiligt gewesen war, die Schaffung einer Buchstabenschrift ohne ein direktes Vorbild war vom zeitgenössischen Standpunkt eine selbständige Leistung, und die Endprodukte der Experimentierphase, die einzelsprachlichen Schriftsysteme, standen in keiner ersichtlichen Anhängigkeit zu irgendeiner der damals bekannten Schriften".*

Spreading out of the Syrian-Palestinian region, the consonantal script developed into two different directions:

- to the South-Semitic scripts of the Arabian peninsula (North-Arabian and South-Arabian scripts)
- to the Northwest-Semitic scripts (Phoenician, Aramaic etc.)

A first comparison (Figure 1) based only on external criteria (the form of the characters) will demonstrate similarities and differences between the LB script and both main branches of the Semitic family of scripts. The

first hurdle is to decide what should be compared. There is not just one single Phoenician alphabet or one single "Thamudic" alphabet. What was ten years ago still called "Thamudic", today occurs as a complex group of scripts subdivided into different regional alphabets (Macdonald 2000). In any case, it is not appropriate to compare characters from totally different periods.

Having tried out comparisons with all relevant alphabets, two of them produced the best results: for the South-Semitic group, I chose the so-called "Oasis-North-Arabian" (ONA) alphabets, a group of very similar alphabets consisting of Dumaitic, Thaymanitic (former Thamudic A) and Dedanitic (former Lihyanitic).

For the Northwest-Semitic group, I chose the Old-Phoenician (OP) alphabet from the eleventh to the eighth centuries BC as it is documented by Friedrich/Röllig (1970) and by Sass (1991). For the LB script, I chose an idealized alphabet with right-angled forms (this alphabet will be discussed later). Of course, such a comparison is no objective analysis. It is not possible to define in exact terms the criteria that make something similar.

The comparison of LB with ONA (Figure 1, right) results in five signs of identical form and meaning (column 2) as well as three other signs whose derivation from ONA characters is possible to conceive (column 3). The relationship to other alphabets of this group (Thamudic B, C, D, Hismaic, Safaitic) is less convincing. It is tempting to say that some LB characters were derived from the collection of "Thamudic" alphabets, but it is improbable that scripts from different regions and different times were models for the LB script. It is a fact that the South-Semitic scripts were used on the Arabian Peninsula. If the LB script *was* derived from South-Semitic scripts, we would have to assume a comprehensible cultural connection between this region and northwestern Africa. However, there was no cultural connection between these regions at that time.

The comparison of LB with OP (Figure 1, left) is more convincing: seven signs of totally identical form (column 2) are supplemented by four other signs with very similar shapes (column 3). In some cases, the new signs resulted from dropping superfluous strokes (𐤌 𐤎 𐤇 𐤆); from straightening one line (𐤍); redoubling one line (𐤋); or separating one line (𐤉). In general, most of the modifications can be interpreted as a clear tendency towards reduction, symmetry and more geometric shapes. This simple comparison of sign shapes shows that the LB script was more probably derived from the OP alphabet than from ONA alphabet.

PHOENICIAN				ONA		
1	2	3		3	2	1
			A			
			B			
			G			
			D			
			H			
			W			
			Z			
			Ḥ			
			Ṭ			
			Y			
			K			
			L			
			M			
			N			
			S			
			ʿ			
			P/F			
			Ṣ			
			Q			
			R			
			Š			
			T			

Fig. 1. Comparison: Old Phoenician and Oasis North Arabian alphabet

In the following chapter, I will clarify in which ways this script could have come from the Near East to North Africa; where and when this borrowing took place; and whether there are also similarities within the internal structure of these scripts.

2.2 Time, place and way of creation

Assuming that the LB script derived from the OP script, we must determine the location of the oldest LB inscriptions and their dating. The oldest inscriptions would normally be found at the location in North Africa where the Near-East script was first brought over. It is then a question of demonstrating how the LB script developed from a reconstructed "proto-alphabet" and then spread throughout North Africa including the Canary Islands.
Assuming that the interpretation of the Punic part of the bilingual RIL 2 is correct, the oldest datable LB inscription is from the tenth year of government of king MKWSN = Micipsa (138 or 139 BC). Apart from that inscription no other of the more than thousand further inscriptions can be dated - not even approximately. The date of their origin is generally to be presumed between the third or forth century BC and the end of the Roman government (Galand 1989b:70). It should be noted that these presumptions are valid only for the monumental and grave inscriptions.
The tens of thousands of rock inscriptions of the LB type range throughout a wide variety of cultural eras. Their absolute dating is impossible for the time being (except the painted ones); indirect indications of their age can be understood through their context as well as through their internal and external structures of script. In the very comprehensive bibliography of the LB script, there have only been a few attempts at searching for the oldest inscriptions. One of the few considerable exceptions is Camps's paper "Recherche sur les plus anciennes inscriptions Libyques de l'Afrique du Nord et du Sahara" (1979). He starts with citing the common doctrine of "ex oriente lux":
"Suivant une logique toute historique il a été admis que l'alphabet le plus ancien était celui de l'est et que l'écriture progressa vers l'Ouest et vers le Sud comme les cultures méditerranéennes" (1977:144).
Camps breaks from this doctrine by referring to the discovery of the inscription of Azib n'Ikkis by Malhomme/Galand (1960).
Unfortunately, a great part of this rock art panel located on Morocco's High Atlas has been destroyed. However, it can be reconstructed from several old photographs. Very similar human representations have been found on other panels at Azib n'Ikkis and in familiar locations of the High Atlas. The division of the body with two vertical lines and the LB inscription on the right side of the body makes this rock art panel absolutely unique. Because of additional representations of weapons, Malhomme dated the site of Azib n'Ikkis as Bronze Age II and added the

obvious observation that the inscription was created using the same technique and has the same patina as the human representation.

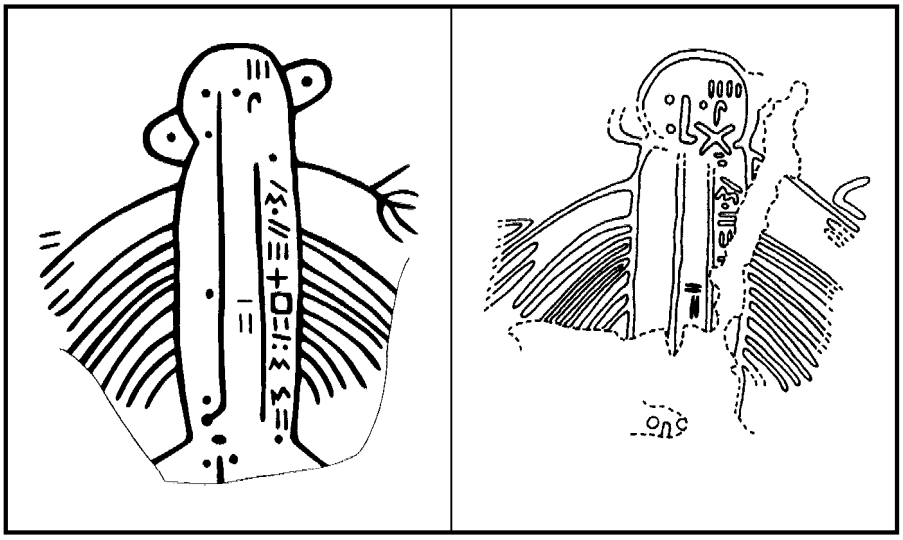


Fig. 2. “L’homme des Azib n’Ikkis” according to Malhomme (1961) and Rodrigue (1999)

In his epigraphic commentary, Galand came to the cautious conclusion that *“le texte est plus proche des inscriptions antiques que des modernes”* (Malhomme/Galand 1960:421). He determined that the majority of the signs are common to the Libyc alphabets as well as to the Twareg alphabets. However, two of the signs (II and III) show a distinct ancient character.

“Si l’inscription libyque des Azib n’Ikkis est contemporaine des gravures de poignards et de hallebardes et si ces armes appartiennent à l’Age du Bronze nous sommes en présence de la plus vieille inscription alphabétique connue, dans une région nullement favorable à l’éclosion d’une telle écriture” (Camps 1978:149).

The possibility that the inscription of Azib n’Ikkis originated from the Bronze Age caused great confusion among scholars. Several of them refused to accept this dating. Only Galand-Pernet (1988:65) sided with the dating being from the seventh to the sixth century BC. The common school of thought has continued to follow the doctrine “ex oriente lux”. Lhote spoke for the majority when he wrote that the greatest density of inscriptions can be found in Tunisia, south of Carthage and east of Constantine. Mukarovsky (1981:38) chose an even more extreme formulation: the LB script has been totally alien to Northwest Africa (present-day Morocco and Western Algeria). In total contrast to this,

Galand saw the eastern inscriptions as the result of a local evolution, not as the beginning: *"Dans l'histoire incertaine de l'écriture libyque, elles (les inscriptions de Dougga) représentent le point d'aboutissement d'une évolution locale, et non un point départ"* (1996a:79).
However, one single inscription is insufficient evidence to contradict common opinion. At the time of this discussion our knowledge about Moroccan rock inscriptions was extremely deficient. During the 1950s some lines from Foum Chenna and Taouz were published; in 1960, the lines of Azib n'Ikkis and Oukaimeden that, interestingly enough, were not included in Camps's list of the oldest inscriptions, were published. Altogether they present a very small corpus of lines of mostly different characters and contexts, and thus provide an insufficient basis for essential analysis and reports. Not until the 1990s did a systematic field research by Pichler and Rodrigue lead to an increase of documented inscriptions (Pichler 2000a, 2000d, Pichler/Rodrigue 2000, 2001, 2002, 2003, Rodrigue/Pichler 2002). However, the situation was still a confused muddle that could not be disentangled: there were so many variations concerning the shape of the signs, the patina, the context etc. The confusion lasted until the conclusive realization that the whole corpus of Moroccan inscriptions can be divided roughly into two groups:
1. "Ancient" inscriptions: with dark patina, without dotted signs, with ancient context: circles, weapons, carts etc. Sites: Msemrir, Meskaou, Taouz, Azib n'Ikkis, Oukaimeden etc.
2. "Modern" inscriptions: with pale patina, with dotted signs, with LB context: linear horses and camels, horsemen etc. Sites: Foum Chenna, Ikhf n'Ouraoun, Tazzarine, Wiggane etc.
There is, of course, no exact separation between these two categories: there are overlaps and even different types of script (dating from different periods) at the same location and even on the same panel. However, one fact is now clear: there are multiple old rock inscriptions in Morocco, which therefore could have been the place of origin of the LB script.
The next question we have to deal with is: During what period and in what circumstances was a Near Eastern alphabet brought to Morocco? In general, there are two possibilities of contact between people living in the territory now called Morocco and the Near East. These people could have gone to the Near East as travellers, soldiers or traders and brought back the idea and practice of script to Northwest Africa. The second possibility is much more likely: Near East colonists migrated to Northwest Africa and brought along their script. In this case, the OP thesis becomes a much better proposition than the ONA thesis. In fact, Phoenician colonists reached the Pillars of Hercules as early as c. 1100 BC and founded

settlements on both continents: Karteia, Abdera, Gadeira on the Iberian Peninsula, Tingis and Lixus on the Atlantic coast of Northwest-Africa. As one would expect, the inhabitants on both sides of the Strait of Gibraltar came into close contact with the Phoenician settlers, trading goods as well as culture. The local people soon recognized the advantages of using script.

The sequence of events which led to the genesis of the Iberian script on the northern side of the Strait is well documented (Untermann 1997). Apart from a heated discussion concerning details, there is agreement on the central premise that the Old-Hispanic alphabets derived from the OP. This derivation can be shown through the similarity of a series of signs. However, they did not take over the internal structure of the OP script. Instead of representing each consonant by a sign, Old-Hispanic alphabets used a mixed system: only some consonantal phonemes like /l/ or /n/ were represented by one sign, and in the case of plosives, they used one sign for each combination plosive + vowel. Therefore, there were signs for /ta/, /te/, /ti/, /to/ and /tu/, but not for /t/. To compensate for the disadvantage of using fifteen signs where the Phoenician/Greek scripts needed only three (for /t/, /p/, /k/), they did not represent the difference between voiced and unvoiced phonemes (i.e. no signs for /d/, /b/, /g/).

The most interesting part of the innovation is the system of writing vowels. The OP alphabet originally was conceived as a pure consonantal script. However, in the very early stages of development there are already three signs for half vowels (or half-consonants):

aleph for indifferent vowels at the beginning of words/syllables
waw for /w/
jodh for /j/

According to Untermann (1997:55), the next step that led to writing vowels had already taken place among the OP method of writing. In addition to their first function, these three signs could *also* be used to represent classes of vowels (matres lectionis):

aleph for long /a/o/e/
waw for long /o/u/
jodh for long /e/i/

In order to obtain a complete vowel-system, it was necessary to add – as a third step – two more signs by giving a new phonetic definition to existing graphemes:

ajin(he) – for /e/
heth – for /o/

Untermann is certain that this final step was influenced by Greek settlers to the eastern coast of the Iberian Peninsula. He dates the first stage to the tenth century BC in Palestine; the second and third stages to between the eighth and sixth centuries BC in southern Iberia.

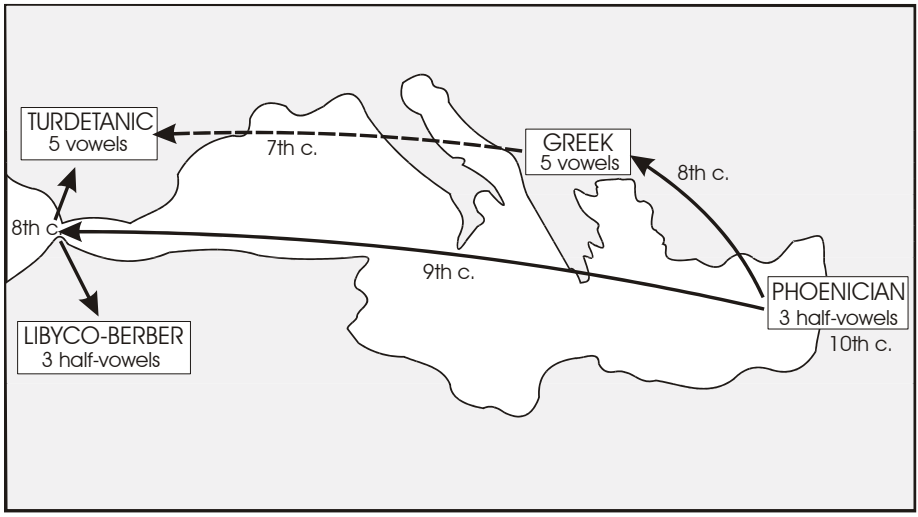


Fig. 3. Evolution of the vowel systems in the Mediterranean

My theory proposes that a comparable development took place south of the Strait of Gibraltar. In fact, this idea is not totally new: *"Il n'est pas trop hardi d'imaginer que des Maures ou des Gétules qui, en été, transhumaient dans le Haut Atlas, aient utilisé une écriture déjà alphabétique"* (Camps 1978:151). Galand (1989b:81) also takes into consideration the possibility of the Mauri's initiative role in the so called "alphabet au chevron". Furthermore, Untermann calls the LB alphabet the only African branch of the Phoenician script *"mit einer merkwürdig geometrischen Sonderentwicklung der Schriftzeichen, aber dem gleichen inneren System wie das phönizische Vorbild"* (1997:49).

The adaptation of the OP alphabet to the Mauri's language followed somewhat different principles south of Gibraltar than north of it. Three steps of adaptation are common in principle, but different in practice:

- taking over a series of characters including their phonetic meaning
- omitting some unused characters: heth, ajin
- adding necessary signs, e.g. more signs for sibilants

The adaptation of the system of writing vowels did not follow the Old Hispanic example; it remained still closer to the OP model of using three matres lections, but with one striking difference. The OP script was constructed for languages that use consonants as the beginning of syllables: /ba/, /ta/, /ka/ etc., thus necessitating a sign to indicate vowels in

initial positions: 𐤀. Rössler (1979:91) formulated the theory that the LB script was constructed for languages which use consonants as the end of syllables: /ab/, /at/, /ak/ etc. This would be an excellent explanation for the fact that the creators of the LB script replaced the sign for initial vowels by a new sign for vowels in final position: /ʾ/. Unfortunately, Rössler is on his own with this phonetic suggestion. However, this new sign was introduced and some Latin and Punic bilinguals show that it was used for /a/, /o/, /y/ and for final /us/ as well.

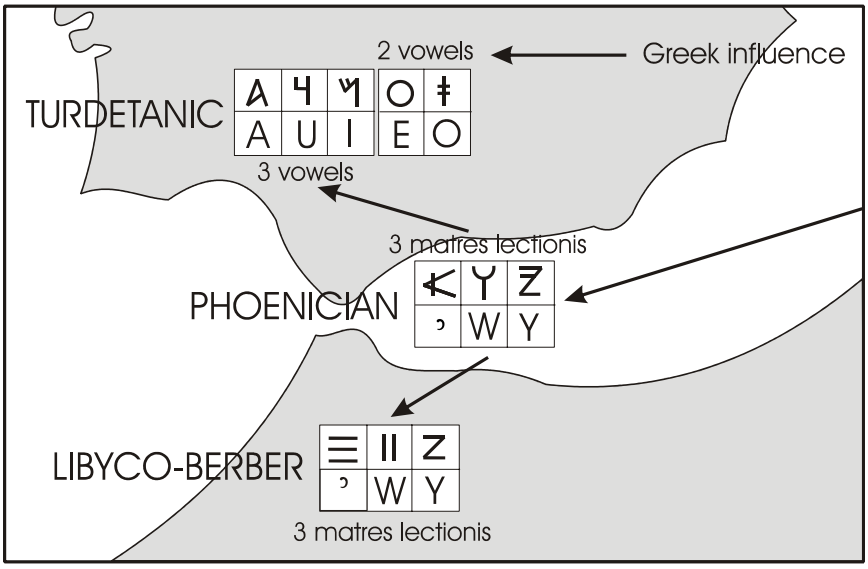


Fig. 4. Evolution of the vowel system

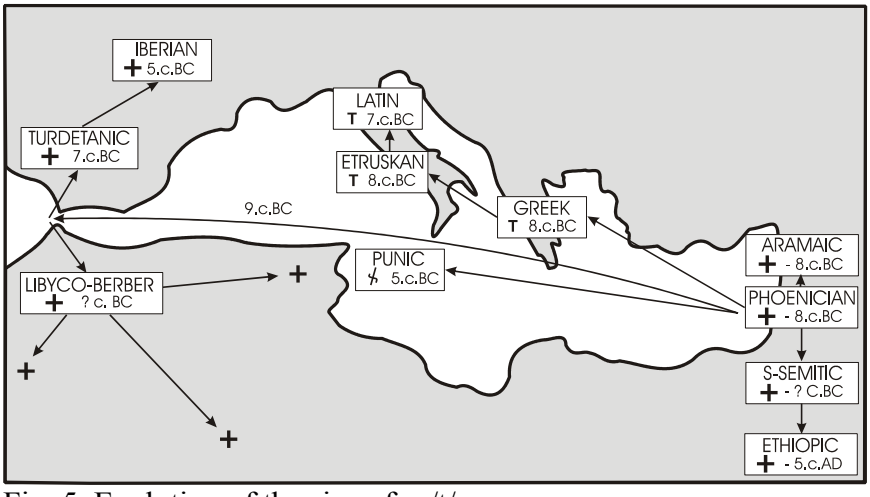


Fig. 5. Evolution of the signs for /t/

For the period of time in which this adaptation of the OP script could have occurred we have two temporal borders. The period of innovation of three matres lectionis at the tenth century BC is our terminus post quem. The terminus ante quem can be reconstructed from the development of the sign for /t/. Figure 5 shows that the sign + for /t/ was used in Palestine only up to the eighth century BC (with the exception of the Ethiopic script). Later on other signs were used in all relevant scripts.
Many writing systems are extremely conservative and bound by tradition. In the case of the Near Eastern scripts the chain of tradition can sometimes be followed over 2000 – 3000 years.
Even if the LB script is a totally geometric one, a series of signs have preserved the memory of their iconic ancestors:

B		=		house
G		=		throw-stick
N		=		snake
R		=		head
T		=		mark

Fig. 6. Iconic ancestors

This is important evidence of the OP origin of a considerable part of the LB alphabet.
It is possible, for example, to follow the development of the sign for /k/ and its ancestors from the first Sumerian pictograms to the highly elaborated scripts of the Mediterranean (Fig. 7). Sometimes between the ninth and the eighth centuries BC the OP sign for /k/ changed from to . This seems to be the most plausible time for the derivation of the LB sign, which followed its own course during several centuries (Fig. 8). The derivation could have occurred either from the older or from the younger variant of the OP sign for /k/. As the signs for /k/ are extremely rare among the archaic rock inscriptions, we were not able to state with certainty which was the original LB sign for /k/. The three variants surrounded by circles are the most frequent ones during the history of LB script.

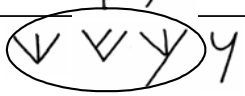
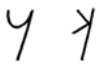
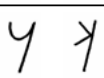
Pictogram	Old Sumer		“hand”
	Crete		“hand”
Cuneiform script	Babylon/Assur		“hand”
	Ugarit		k
Alphabetical script	Proto-Sinaitic		k?
	Old Phoenician		“hand” = k
	Aramaic		k
	Nabatean		k
	Archaic Greek		k
	Etruscan		k

Fig. 7. Development of the signs for /k/

	or:	

Fig. 8. Development of the Libyco-Berber signs for /k/

Let us see if this dating can be confirmed by the evolution of other signs: while some signs (e.g. for /g/, /y/, /š/) never changed their form in the time between the eleventh and the fourth centuries BC, others (like the ones for /k/, /z/, /s/, /t/) changed their form in the period between the ninth and the sixth century BC. Therefore, if the assumption is correct that the innovation of the three matres lectionis occurred in the tenth century, the time span for the possible period of adaptation is limited to between the tenth and eighth centuries BC.

	11th c.	10th c.	9thc.	8thc.	7th c.	6th c.	5th c.
g							
y							
š							
k							
z							
s							
t							

Fig. 9. Corridor for adaptation

The last and most important stage of adaptation was the arrangement of all signs according to principles of economy and the aesthetics of writing. Most of the scholars who dealt with the genesis of the LB script recognized the very special character of the shape of the signs:
"merkwürdig geometrische Sonderentwicklung" (Untermann 1997:49)
"gesuchte Einfachheit der Züge" (Blau 1851:338)
"ausgesprochen symmetrischer Charakter" (Lidzbarski 1902:365)
"rein geometrisch" (Meinhof 1931:44)
"willkürlich erschaffen" (Friedrich 1937:339)
"starre symmetrische Formen" (Friedrich 1966:95)
Both main elements of these descriptions are correct in every respect:

- the geometric structure
- the intentional construction

Only a few scholars searched for the system behind these geometric constructions.
Meinhof (1931:44) had the idea that the signs are parts of a system of crossing lines similar to "secret writing" used by children, and to the code invented by the freemason James Leason and used in the inscription on his gravestone dated 28th September 1794 (Kippenhahn 1997:31f).
Most researchers had in mind Arabian tribal marks (wusum) or camel brands as models for the signs added to the OP alphabet, others favoured geometric motifs in Proto-Berber rock art. This assumption cannot of course be contradicted but it does not answer the essential question: why this signs and not others? Was it mere accident or was the collection intentional?

2.3 Economy of writing

Die psychischen Grundelemente des Denkens sind bestimmte Zeichen und mehr oder weniger klare Bilder, die "nach Wunsch" reproduziert oder kombiniert werden können.
Einstein

There are only a very small number of elementary signs. In general the simplest ones are the line, the cross, the square and the circle. Frutiger (1978:62) calls the combination of these four signs the "complete sign":

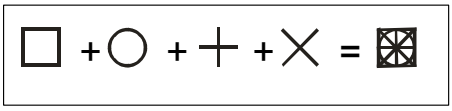


Fig. 10. Complete sign

Omitting the circle for our purpose (in the LB script the circle is only a variation of the square) the basic structure of the LB script remains in form of a cross as the *"prototype of a sign"* (Frutiger 1978:29) and a square as the basis for all signs.
The "complete sign" made up of eight straight lines thus fulfils (by omitting curves) a basic standard of economics for a script carved on stone. Out of these single elements one can form – even using only the full length of lines – more than 200 different signs, alone 99 with on to four lines (Figure 11).

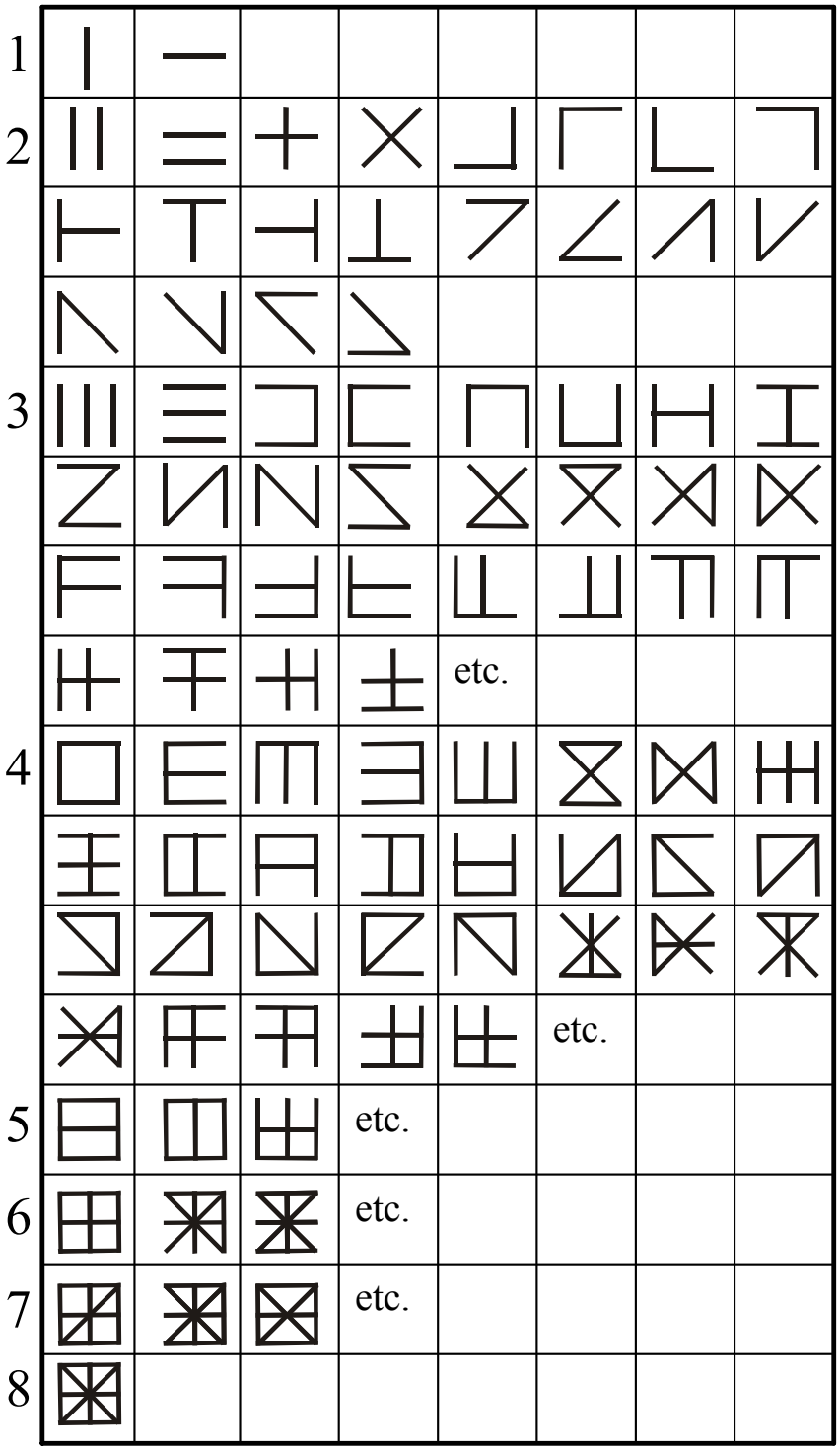


Fig. 11. Signs with 1–8 lines

As an almost pure consonantal script needs only a little more than twenty signs the interesting question arises, which signs were chosen and can we identify a criterion of selection? If we omit from the 99 signs all of those that are formed by twisting others, just 25 signs remain. As we will see in the next chapter symmetry is a very important aspect of the LB script. We have divided the whole sample of 25 signs into symmetric and not symmetric signs (Figure 12):

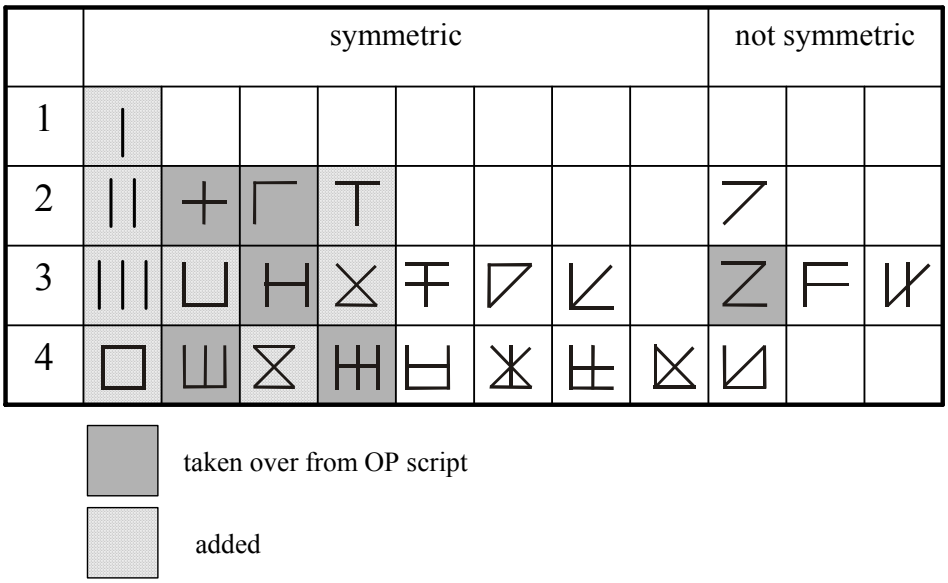


Fig. 12. Symmetric and not symmetric simple signs

The following table gives a clear picture of the selection of signs:

- No sign with more than four lines was used.
- All signs borrowed from the OP alphabet belong to the sample "simple symmetric signs with 1–4 lines" (with one exception: Z).
- To complete the necessary repertoire of signs, all simple symmetric signs with 1–2 lines and a considerable part of those with 3–4 lines were used.

This obviously intentional selection corresponds approximately with Frutigers "reduction of gestures", a choice of simple techniques for forming signs (Figure 13).

As we will see further on in the analysis, basic rules were never followed with one hundred percent in the LB script, and a few signs deviate from this system:

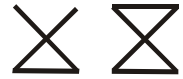
1. single line	
2. duplicaton	
3. crossing/right angle	
4. right angle	
5. marking the centre	
6. attaching in the middle	
7. acute angle	
8. crossing acute angle	

Fig. 13. Degrees of difficulty

B = ⊡: this is a small deviation from the system; the centre of the ideal sign is marked by a dot.
Ṭ = 𓏺 : this is of course a very simple sign, it is symmetric, but it does not fit into the system.
K = ⅂Γ?: we still do not know exactly which was the original sign for K. If we take the derivation from the OP script seriously, the sign should look like ⩚ or ⩛, which does not really fit into the system described above. However, this system would allow slanting forms like ⇖ .
There is every reason to believe that at some time there was a well thought-out and intentionally constructed basic concept which fell into disuse later on. Nearly all the later variants reveal differences in the basic concept:

- including more complicated signs, which are still in accordance with the concept: ⊞ , ⊟

- including signs with half length of the lines, which do not use the full square form, but still include details of the complete sign: ⵔ,ⵡ
- breaking out totally from the basic concept: ⵑ, ⵎ

The greater the temporal distance from the origin of the script, the more the principles disappear, e.g. in recent Tifinagh, using

- extraordinary forms: ⵚ, ⵣ
- dotted signs: ⵗ, ⵘ
- complex signs for bi-consonants: ⵒ , ⵜ

After I had finished writing this chapter a paper by Oulamara/Duvernoy (1988) came to my attention: "An application of the Hough transform to automatic recognition of Berber characters". Even when analyzing the "modern Berber alphabet" (= Neo-Tifinagh) they come to the same conclusion: *"Taking into account the shape of Berber characters, we can conclude that there exists a master frame from which characters are generated"* (1988:81). This "master frame" is identical to what we term the "complete sign". The only difference is that the Neo-Tifinagh alphabets make more use of the system – needing signs for 29–36 phonemes – including those with lines of half-length.

2.4. Aesthetics of writing

Das Streben nach Symmetrie
ist so alt wie die Kunst überhaupt.
Lidzbarski

In addition to aspects of the economy of writing, aesthetics played an important part during the process of creating the LB script.

2.4.1 Optimal exploitation of the square area:

As regards the intentional construction of scripts, Muess (1989:18) emphasizes that in all cases letters were drawn into a square space. In the case of the Latin monumental script this optimal exploitation of the square screen has turned out well at most letters (e.g. X, H, D), but not at all (e.g. J, P, F):

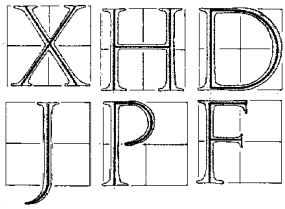


Fig. 14. Examples of Latin letters

In the case of the LB script this principle is followed to a considerably higher degree.

2.4.2 Signs with full-length lines:
Among the numerous possibilities of signs that can be formed out of the elements of the complete sign, only those with full-length lines were chosen. Most of the signs with half-length lines do not fulfil the criteria for optimal exploitation of the square space. Some of these signs was used in later periods and/or other regions as variants: 𐄐,𐄑

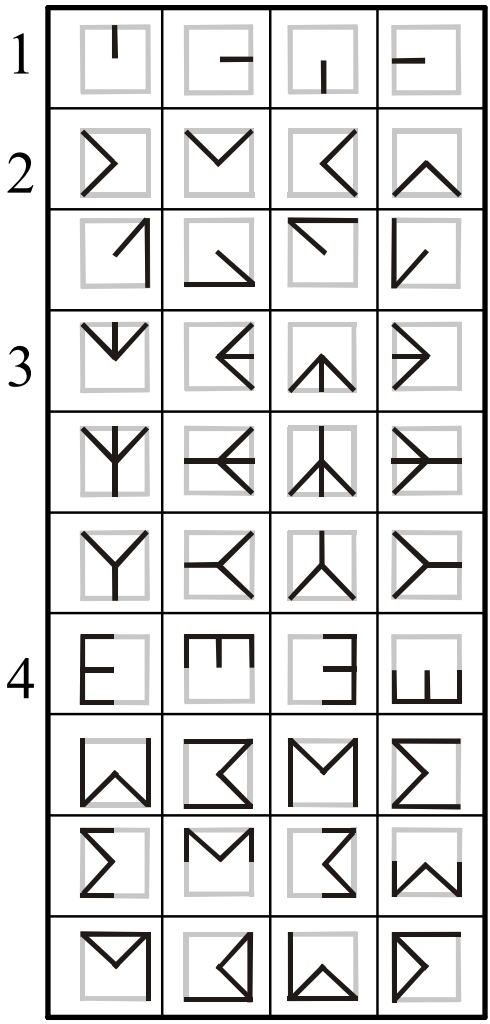


Fig. 15. Signs with half length of lines

2.4.3 Preference for symmetric forms:

Out of the variety of possible signs those with axial symmetry were selected. This bilateral (left-right) symmetry is one of the most important principles of order in nature: it corresponds with the basic shape of many living things and has always been preferred as aesthetically attractive by mankind. Shapes are called symmetric if they do not change their appearance by transformation (reflection, rotation etc.). It is surely no accident that all combinations of lines which show rotation-symmetry in addition to axial symmetry (□, +, ⊡) were elected as parts of the LB alphabet. They are ideal signs in the sense of the aesthetics of script.

Rotation and reflection respectively symmetry are very important with for connecting the signs to different or identical phonemes, and also as an indication of the direction of writing.

The first attempt to describe this system was carried out by me (Pichler 1996:73-78, Pichler 2000b) based upon initial trials by Marcy (1936:142f), Delgado (1964:59) and Galand (1966:16ff). In the following chapter I will try to correct and describe more precisely various details of the system.

3. The system of the LB script

In this chapter we will discuss the following questions: do rotations through 90°/180°/270° or reflections change the phonetic value of a sign or not? Which examples were selected out of the sample of possibilities for practical writing, and which not? Were these selections made by chance or were they intentional? Which signs indicate the direction of writing?

> Terminology for the different signs for one phoneme:
> Signs with a different form of outline used for one phoneme are called *variants*.
> E.g. ⊙ = ⊡ (=R), ⋀ = ⊔ (=Y)
> Signs for one phoneme, which are the results of rotations or reflections (regardless of whether these alterations are caused by the direction of writing or not) are called *shapes*.
> E.g. ⊔ = ⊐ (=M) dependent on the direction of writing (↑ and ←)
> ⋀ = ⋁ = ⅀ = Z (=Y) independent from the direction of writing.

3.1 Rotations and reflections

3.1.1 Signs without symmetry

It is no surprise that this case is a rare exception among the LB alphabet. There is only one sign without any symmetry: Z. The second shape develops from the first through a 90° turn, the third and fourth shapes by reflections of the first two. In practical writing there are also shapes with roughly 45° turns.

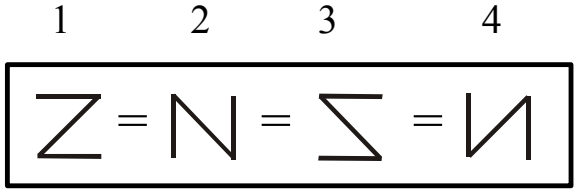


Fig. 16. Signs without symmetry

Thesis 1: all shapes of a sign without an axis of symmetry are allographs of one grapheme.

3.1.2 Signs with one axis of symmetry

The three shapes of the basic form result from a clockwise 90° turn.

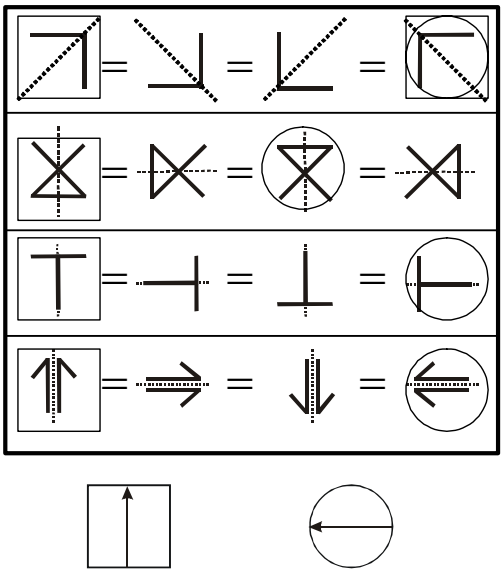


Fig. 17. Signs with one axis of symmetry A

Thesis 2: all shapes of the four signs with one axis of symmetry are allographs of one grapheme.

Sign ᒣ:

In former publications this sign was classified as one without symmetry. In reality it has – in its idealized form ᒪᒧ– a sloping axis of symmetry, but it does not engender the feeling of symmetry in the same way as the others, which have an axis parallel to the direction of writing. In vertical lines shapes 1 and 4 were used with equal frequency, but in horizontal lines only shape 4 was used.

Signs ᙅ, ᒣ and ᒣᒥ:

For practical writing only one shape was selected (almost without exception) according to the direction of writing: shape 1 (with vertical axis) for vertical writing, shape 4 for horizontal writing. The astonishing exception is the use of shape 3 of the sign ᙅ for horizontal writing. In normal vertical lines these three signs can be used as indicators of the direction of writing.

Signs ⊐ and ∃:
Both shapes with a horizontal axis (shapes 1 and 2) were used in vertical writing, in horizontal writing only the ones open to the left (shape 4), seen in the direction of writing.

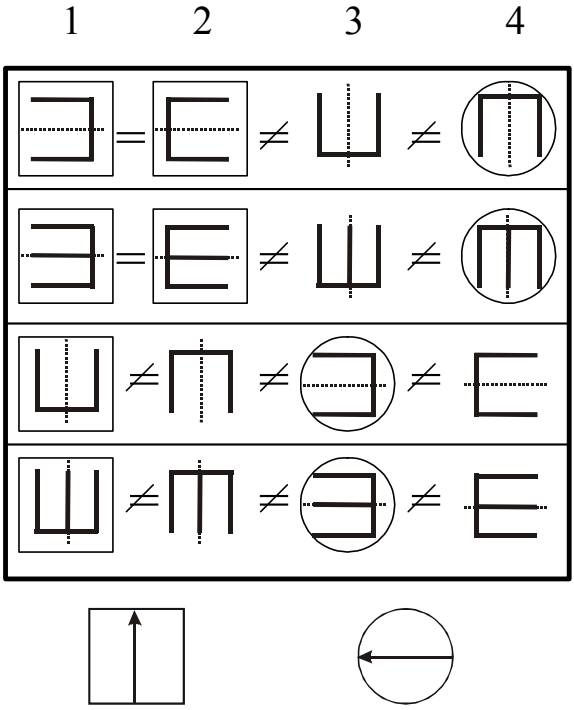


Fig. 18. Signs with one axis of symmetry B

Thesis 3: the shapes of the signs ⊐ and ∃ with a horizontal axis of symmetry are allographs of one grapheme: a 180° turn does not change the phonetic value.

Signs ⊔ and ⊔:

For practical writing there only the shapes open on the top were selected: in vertical lines shape 1, in horizontal lines shape 3.

Thesis 4: every 90° turn of the signs ⊔ and ⊔ changes their phonetic value.

3.1.3 Signs with two axes of symmetry

Signs 𐤉 and 𐤊:

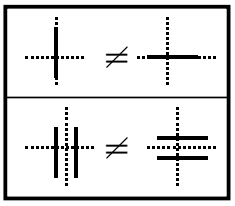


Fig. 19. Signs with two axes of symmetry A

Thesis 5: a 90° turn of the signs 𐤉 and 𐤊 changes their phonetic value.

Signs 𐤄, 𐤅, 𐤆, 𐤇 and 𐤈:

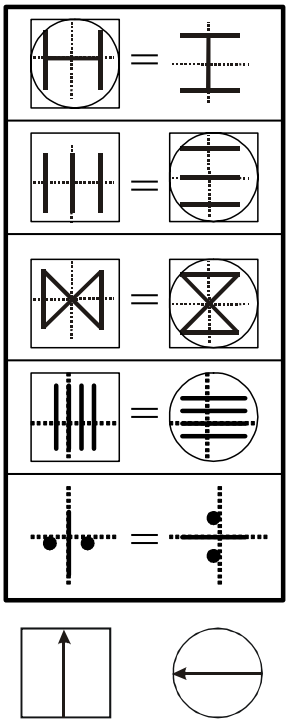


Fig. 20. Signs with two axes of symmetry B

Thesis 6: a 90° turn of the signs 𐤄, 𐤅, 𐤆, 𐤇 and 𐤈 does not change their phonetic value.

Their selection for practical writing does not follow a constant system.

3.1.4 Signs with 4 axes of symmetry

The signs □ and ⊡ are indifferent for 90° and 180° turns, the signs + is sensible for a 45° turn (×), but this does not change the phonetic value.

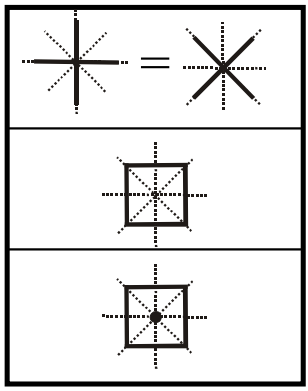


Fig. 21. Signs with four axes of symmetry

3.2 Variants

3.2.1 Round instead of angular

Thesis 7: round and angular variants of one sign are allographs of one grapheme.

This variation is possible for nearly all signs and was used in later stages of development for most of them. As a result of field research on the Canary Islands we now know that round variants were preferred for pecked signs, and angular ones for scratched signs.

3.2.2 Acute angled instead of right angled

Thesis 8: acute angled and right angled variants of one sign are allographs of one grapheme.

For most of the signs this equality is beyond discussion, other examples are disputed: ⊓ = ∪ = W = ⩛ ?

normal form	round variants	acute angled variants
⊏	⊂	〈
⊐	⊃	〉
⊓	∩	∧
⊔	∪	∨
⊐	⋓	⩔
⊐	⋒	
⊐		≼
∃		
⅄	⅋	
⅄		
⋉	∝	
⋊	⋉	
N	∼	
И	∽	
Σ	S⊓	
Z	ƨ	
⅂Γ	⅂	⅃↾
Γ		↾
⅄	⅋	
⋈	∞	
□	○	
⊡	⊙	

Fig. 22. Round and acute angled variants

4. The evolution of the Libyco-Berber script

Unité et diversité restant le
leitmotiv des études berbères.
Galand

4.1 Proto-alphabet

If an alphabetic sequence were to be found – a working instrument as was usual in most parts of the ancient world – it would look similar to our reconstructed Proto-alphabet. I am sure that something similar to traditional writing schools must also have existed in north-west Africa too.
Researchers in Old-Hispanic epigraphy were fortunate enough to have found just such an alphabetic sequence in 1985 in Espanca, on the eastern border of the territory containing Turdetanic/Tartessic inscriptions (Untermann 1997:58). Such alphabetic sequences contain mistakes and variations, but they are never arbitrary. At the very least they represent a local standard of script learning, mostly reflecting a conservative tradition of writing, from which one would deviate in certain details for daily use. Such alphabetic sequences present their characters in a specific order which is borrowed from the model alphabet: omissions are possible, but no additions. The new signs are added at the end of the sequence. So the only possible deviation from Figure 17 is a division into three parts:

- signs with identical form and value
- signs with changed form and/or value
- new signs

It is not certain that an inscription that fits this Proto-alphabet perfectly will ever be found. The same thing occurred with the sequence of Espanca: it differs in some details from all inscriptions found so far.

For the purpose of writing the language/s spoken in north-west Africa, the OP alphabet was not a one hundred percent fit: three signs were omitted, and three signs for sibilants were added. Most of the resulting 22 characters are beyond discussion. Their phonetic value is well attested by biscripts from a period some hundred years later, and six of them did not change their value for more than 2000 years. The only signs with insecure classification are those for sibilants. Throughout the history of the Libyan/Berber peoples this group of signs was the most unstable, with many variations in shape and changes in the phonetic value. We do not know if there originally existed six or seven signs for sibilants. The most

uncertain sign is that for /q/gh/: we do not know what it looked like because so far not one example has been found, neither in Morocco nor on the Canary Islands. There is only one sign from Kabylia, which has a certain similarity to the OP sign and to the one from Dougga.
For the uncertainty of signs for /k/ see page 30.

G	
D	
H	
W	
Z_1	
Ṯ	
Y	
K	
L	
M	
N	
S_1	
P/F	
S_2	
Q	
R	
S_3	
T	
Z_2	
S_4	
Z_3	

Fig. 23. Proto-alphabet
(↑ direction of writing)

4.2 Archaic script

Who adopted the script from the Phoenician settlers? We can assume that there existed a tribal federation called Mauri in the period from the seventh/sixth to the fourth century BC in present-day Morocco. These people – or their ancestors – must have settled not only in the plains of the north, but also, at least as transhumant people, in the mountains of the High Atlas and the Anti Atlas. Apart from thousands of petroglyphs depicting human beings, animals, weapons, utensils etc., they left a group of inscriptions which are possibly the oldest ones in LB history.
The fact that there are comparatively few inscriptions in the Moroccan territory is not a valid counterargument. The place of adaptation of the OP script is not necessarily the region with the greatest number of inscriptions. It is possible that only few people were able to use the technique of writing. The location of cultural influence may have been situated in the north (Tingis, Lixus etc.), but Mogador is also a possibility.

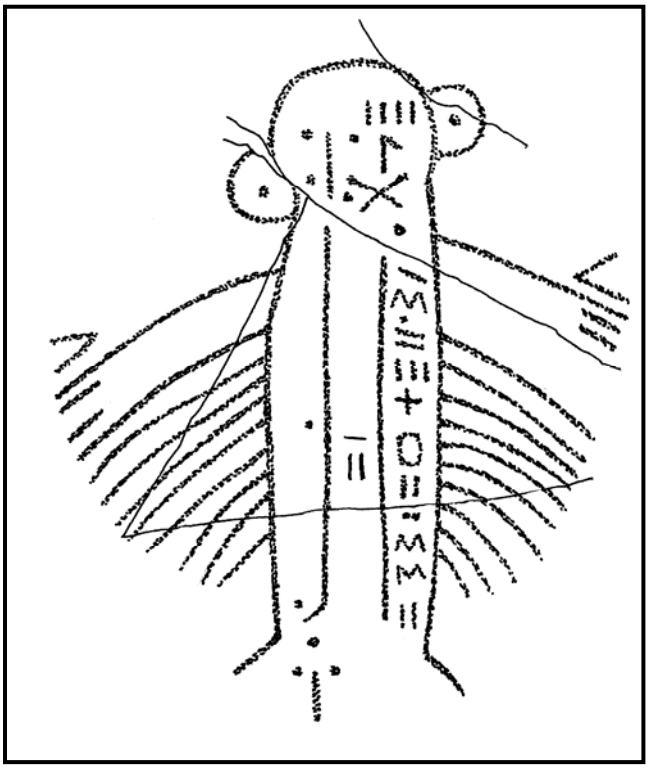


Fig. 24. Azib n'Ikkis 1

Azib n'Ikkis 1:
The "man with the inscription" was engraved on a horizontal surface. The lines were firstly quite deeply pecked out and then carefully polished. The image can be considered as belonging to the third type of series of men in the High Atlas: short body, round head without neck, with eyes, mouth, ears, hands, legs and genitals. The lines on the sides of the body can be interpreted as depicting a leather cloth. The line of inscription is pecked then polished, with exactly the same technique used for the man and with the same patina. The two signs in the centre of the body could have been executed only by polishing.

Fig. 25. Azib n'Ikkis 2

Azib n'Ikkis 2:
The image of what is usually called the "sacrificed man" is one of the most interesting engravings of the Yagour. The contour is deeply and carefully polished. There is no trace of preliminary sketching. Numerous objects surround the man: seven human heads, three daggers, two bows, one boomerang and a quiver (perhaps a small animal – a dog? – near the head), all of the same patina. The head is turned up (one looks up the nose and nostrils, the eyes and the mouth). The legs are curiously and unusually bent. This is possibly the only example (as far as we know) in the High Atlas of an image of a man represented from the back. What has been called in the past the "double hips" are in fact his buttocks.

Oukaimeden:
The frieze of Oukaimeden was not known before Rodrigue discovered it in 1986. It consists of the engravings depicting four elephants, one rhino, a felid, two men and two vertical inscriptions; all of these engravings were made on a vertical surface, a relatively rare occurrence in the High Atlas. The difference between the male figures and the animals on the one hand and the inscription on the other hand is very clear: male figures and animals are rather well pecked out, probably executed by the same person on a non deep surface, although difficult to make out, whereas the two lines of inscriptions are deep and rough. All the engravings are of the same patina.

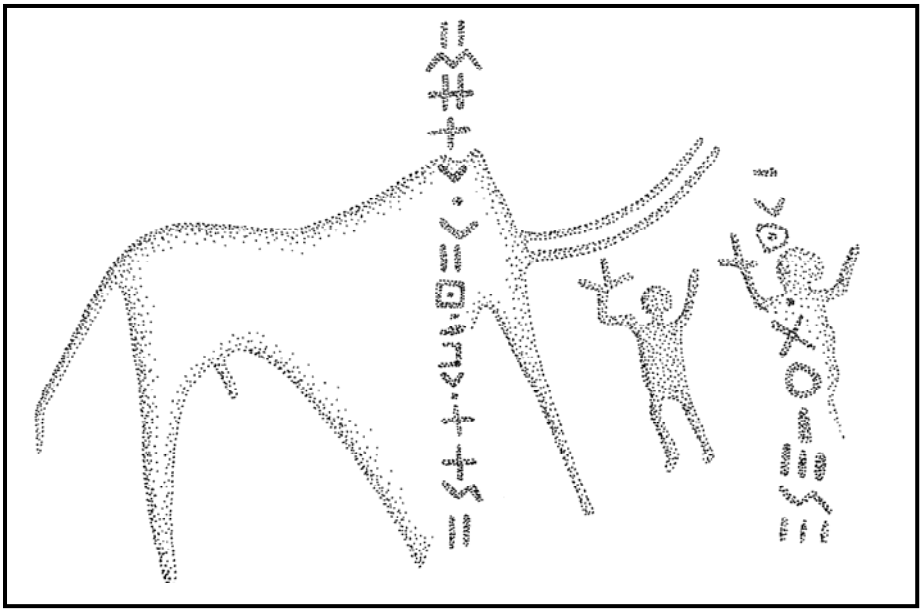


Fig. 26. Oukaimeden

Msemrir:
This site in the Vallée du Dadès was found in 1988 by Rodrigue (Rodrigue 1989, Pichler/Rodrigue 2000). The unique feature of this vertical rock wall consists of between seventy and eighty pecked and polished discs, 5 to 40 cm in diameter. Seven lines of the LB script can be found between these discs and in one example inside a disc. Even if one of the lines is written horizontally, this script undoubtedly belongs to the archaic group. One notable detail: the inscriptions contain the sign ⵅ twice – the only representation in the whole of Morocco apart from one example at Oued Meskaou.

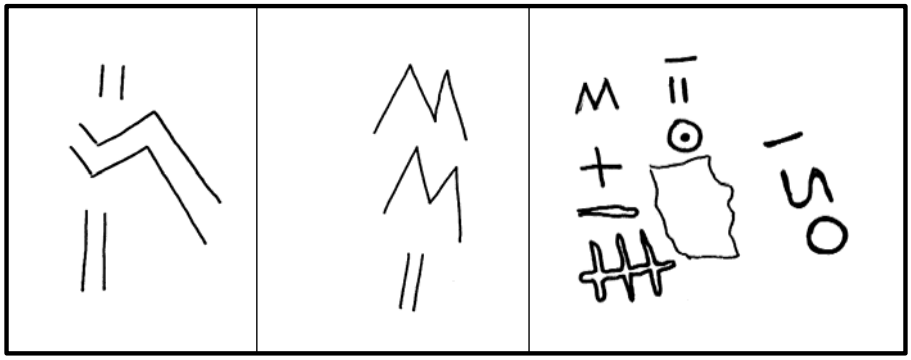


Fig. 27. Msemrir

Ouaremdaz (Waramdaz):
A few kilometres south of Irherm this site was the first one – and so far the only one – with LB inscriptions found in the Anti Atlas (Pichler 1999b).
Substantial differences in the patina clearly evidence three groups of peckings:
1. Patina as dark as the surrounding rock surface: circles, serpentines, geometric motifs etc.
2. Light brown patina: circles, half-circles, human figures and horsemen in linear style.
3. Very light patina: Arabic inscriptions, foot prints, recent dates etc.
There is one strong indication for the comparatively high age of the LB lines: the patina is very dark, in any case much darker than the patina of the human figures and horsemen whose style is described generally as Libyco-Berber ("guerriers libyens"). There are two disconcerting facts concerning this classification. Firstly, the lines run into two directions, which is not typical for this period, but as the inclination of the panel is very small, both directions could be interpreted as vertical lines.

Secondly, there is a tendency to draw shorter and shorter lines until only a point is left. Together with the appearance of the sign ⧺ this panel looks like transitional script (see below). However, in that case the patina would be much paler, at least similar to the LB figures of the neighbouring panels. The classification of this site to the archaic group is therefore probable but not certain.

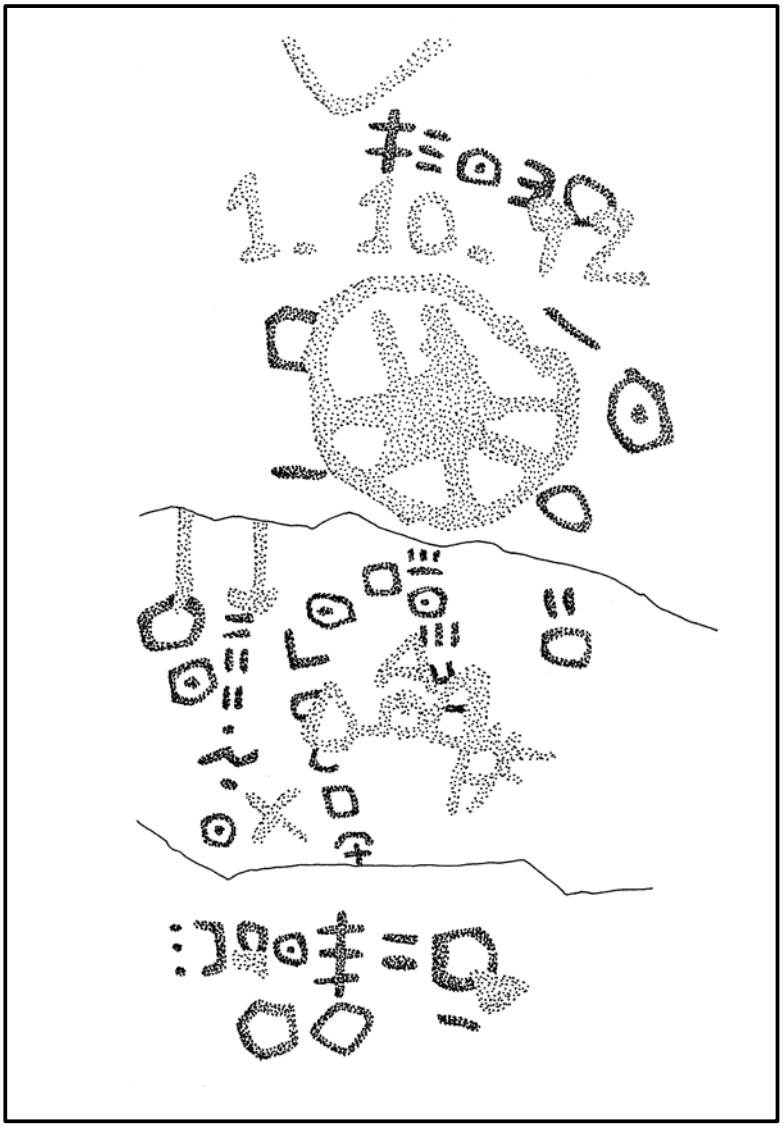


Fig. 28. Ouaremdaz

At least two sites of the northernmost Pre-Sahara fulfil all conditions necessary to be included in the archaic group.

Taouz:
Taouz is nowadays a small military outpost south of Rissani near the Algerian border. Site 1 at the southern part of Djebel Ouafilal was discovered in the 1930s. So far we know of about ten panels with inscriptions, some of them presenting clear lines, some looking rather chaotic (Pichler 2002). There is almost no immediate rock art context besides two chariots, but one can find further series of chariots on surrounding panels.

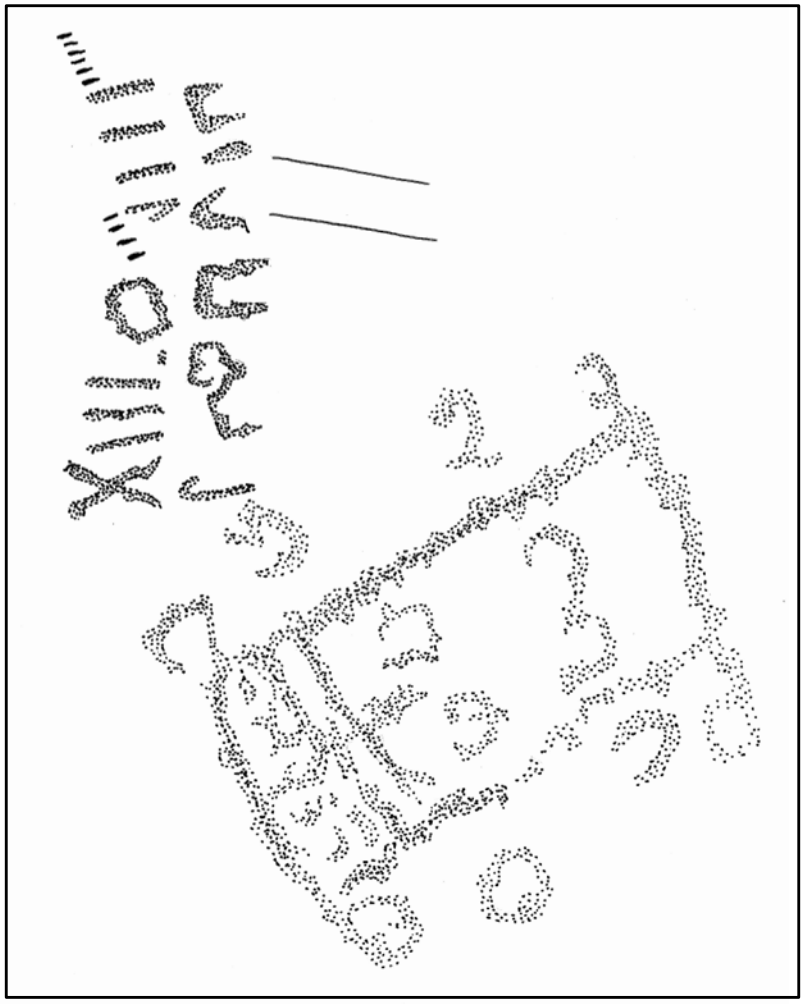


Fig. 29. Taouz

Oued Meskaou (El Mahdaoui):
In 1999/2000 Pichler and Rodrigue documented at this site 20 km north-east of Akka four panels of inscriptions spread over a distance of some kilometres (Pichler/ Rodrigue 2001). Panel 4 shows some vertical lines with signs of different size immediately adjacent to an enigmatic object, often interpreted as the representation of a trap. The patina of the inscription is only a little bit paler than that of the “trap”.

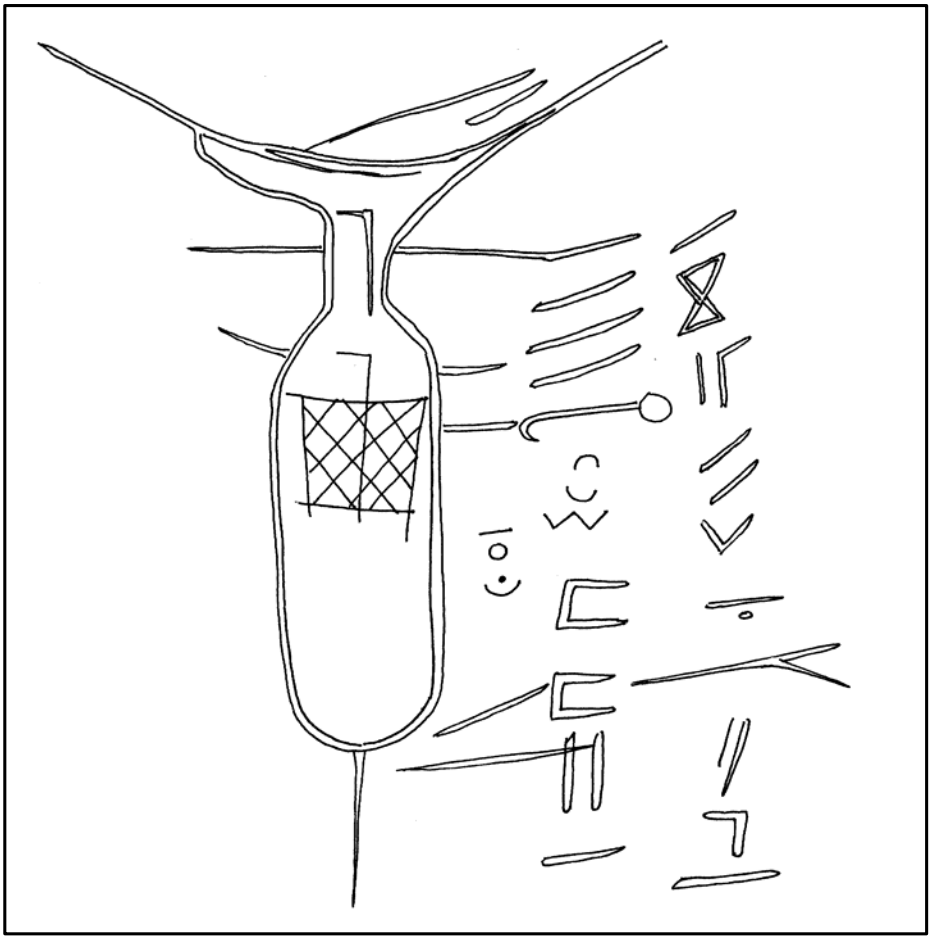


Fig. 30. Meskaou

There are possibly other sites in southern Morocco belonging to the group of archaic inscriptions, but the lines are too short (Tisserfine) or too barely visible (Ifrane n’Taska).

There is a second group of inscriptions which is very close to that of the High Atlas: painted ones in the mountains of the Algerian Kabylia (Poyto/Musso 1969) at sites such as Ifigha, Azrou Tizizoua, Ifrane, Ahmil etc.

Grotte d'Ifigha (Ifiga, Ifira):
This location at the west side of the Montagne d'Aourir is an abri measuring 9 x 4 m covered with more than 400 LB signs in red ochre, and one anthropomorphic and one zoomorphic figure. It was discovered in 1909 by Boulifa. However, only one photo of a detail has been published so far (Springer Bunk 2001:Fig.35). The existing drawings are classified as insufficient by Chabot (1940:185), who registered the inscriptions as RIL 848. Poyto/Musso comment that the inscriptions resemble Twareg rather than Libyan ones, and add that they are not legible because some signs are unknown in the LB alphabet.
Even if we judge the drawings with great caution it is no problem to subsume the signs to a distinct alphabet. A very few strange signs could be either mistakes of the writer or of the documentalist, but in any event they do not constitute an argument against a classification as archaic inscriptions.
Ifigha is by far the most important site of the Kabylia, but Poyto/Musso list a further 22 sites with LB inscriptions, 13 of them documented by drawings. After analysing and comparing them there cannot be the slightest doubt that all of them belong to a homogenous ensemble of inscriptions.

Finally, there is a third group of similar inscriptions on the Canary Islands. It is not possible at the moment to give a precise analysis of the inscriptions of the whole archipelago, for the simple reason that there is not enough documented material for each island. What we can see already now is a division into two different groups:

- the eastern islands (Fuerteventura, Lanzarote) with scratched inscriptions in the context of Latin lines,
- the western islands (El Hierro and probably La Palma) with pecked inscriptions in the context of linear and geometric signs (circles, spirals, labyrinths etc.).

We do not yet know enough about the central islands (Gran Canaria, Tenerife, La Gomera) to be able to say if they belong to one of these two complexes or if they belong to a third one.
On La Gomera recently one large panel was found which seems to belong to the western group.

From Tenerife and La Palma we know of only a few signs, so these lines cannot be classified. At any rate there is no indication for transitional script or Tifinagh.

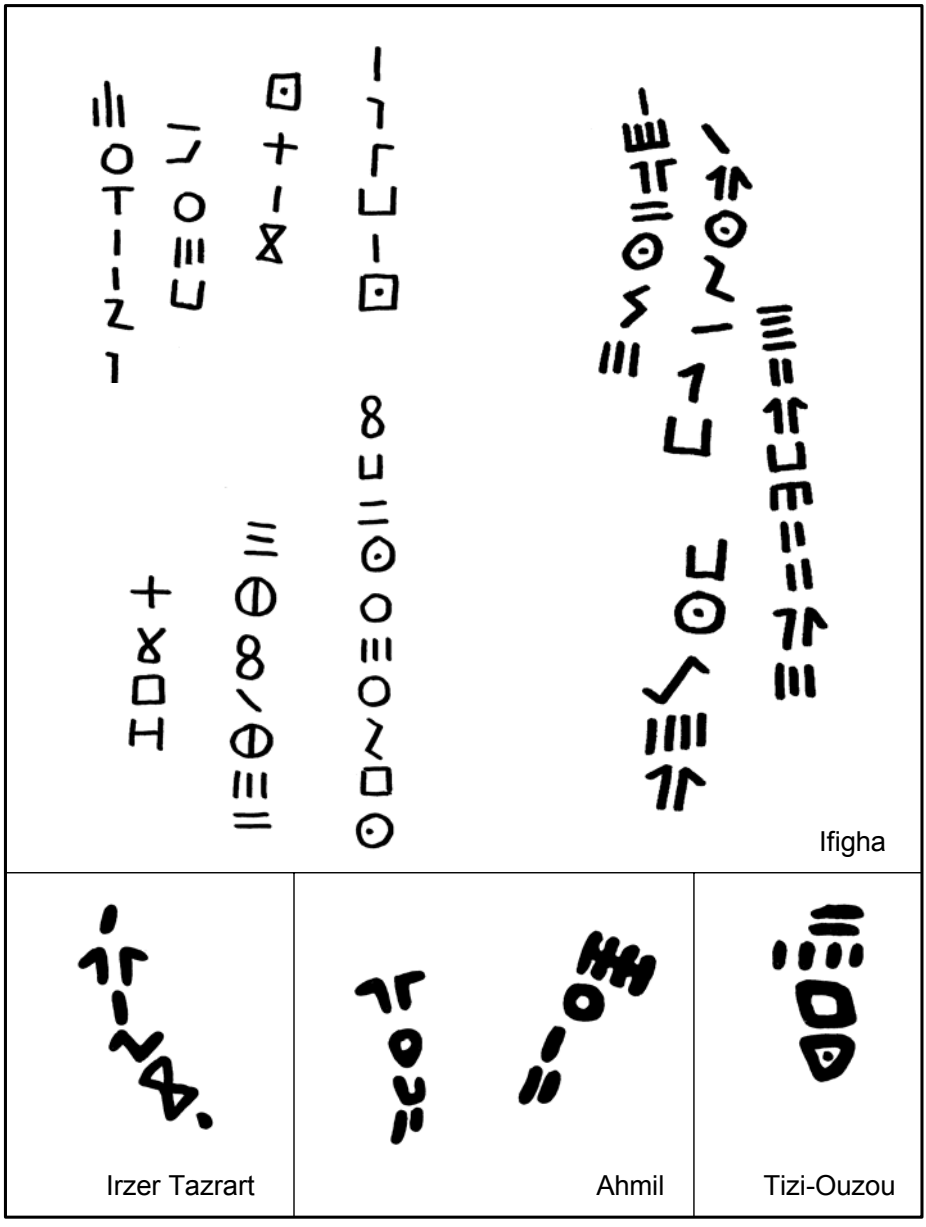


Fig. 31. Examples of archaic script from the Kabylia

So far 20–30 panels from Gran Canaria have been published in various papers, but there is no summarizing analysis. What we know now is that these lines represent a full alphabet which is almost identical to that from El Hierro, Fuerteventura and Lanzarote. Furthermore we can distinguish two different techniques:

- pecked signs (e.g. Barranco de Balos) with a context of "ancient" signs like spirals and anthropomorphic figures,
- scratched lines (e.g. Llanos de Gamona) with no context.

So for the time being it looks as though the inscriptions from Gran Canaria belonged to both groups: the pecked ones to archaic script and the scratched ones to classic script, but this is of course no definite classification. Much more relevant are the "western" inscriptions from El Hierro.

El Hierro:

The discovery of the first LB inscriptions on El Hierro dates back about 130 years, and dozens of papers have been published on the subject. Apart from some scratched lines and one inscription on wood (see below) the majority of LB inscriptions on the island (about 200 lines on 83 panels) consist of pecked signs. The unique site of El Julan stands out as the most interesting: a place of worship of the old Majoreros with concheros, burial caves, altars for burnt offerings and hundreds of petroglyphs on smooth lava panels – geometric signs like circles, circles with a cross inside, spirals, nets etc. (Hernández Pérez 2002). Amongst them are about ten panels of LB script. A second site (Cueva de Agua) is similar to Msemrir/Morocco: some LB lines are located next to a series of circles (Steiner 2002, Pichler 1999a). At the site Los Saltos (Steiner 1998) some inscriptions are accompanied by geometric signs and script-like signs. Many of these short inscriptions can be read as the usual sequence "A., son of B.". A considerable number of the personal names documented at El Hierro are well known from North African inscriptions:

MSKL (RIL 713), in Latin MASCAL (CIL VIII, 22660)
TMN (RIL 36)
NMM (RIL 495)
TLR (RIL 362)
DND (RIL 773)

I would like to propose a dating for the archaic inscriptions of the Canary Islands to 600–500 BC. This fits perfectly to recent results obtained from research in quite different subject areas.

Genetic examinations (of the mitochondrial DNA) of aboriginal mummies and a comparison with the Neolithic population of the Western

Sahara by Rando have encouraged the assumption that a crossover to the Canaries occurred in c. 500 BC (1999:21).

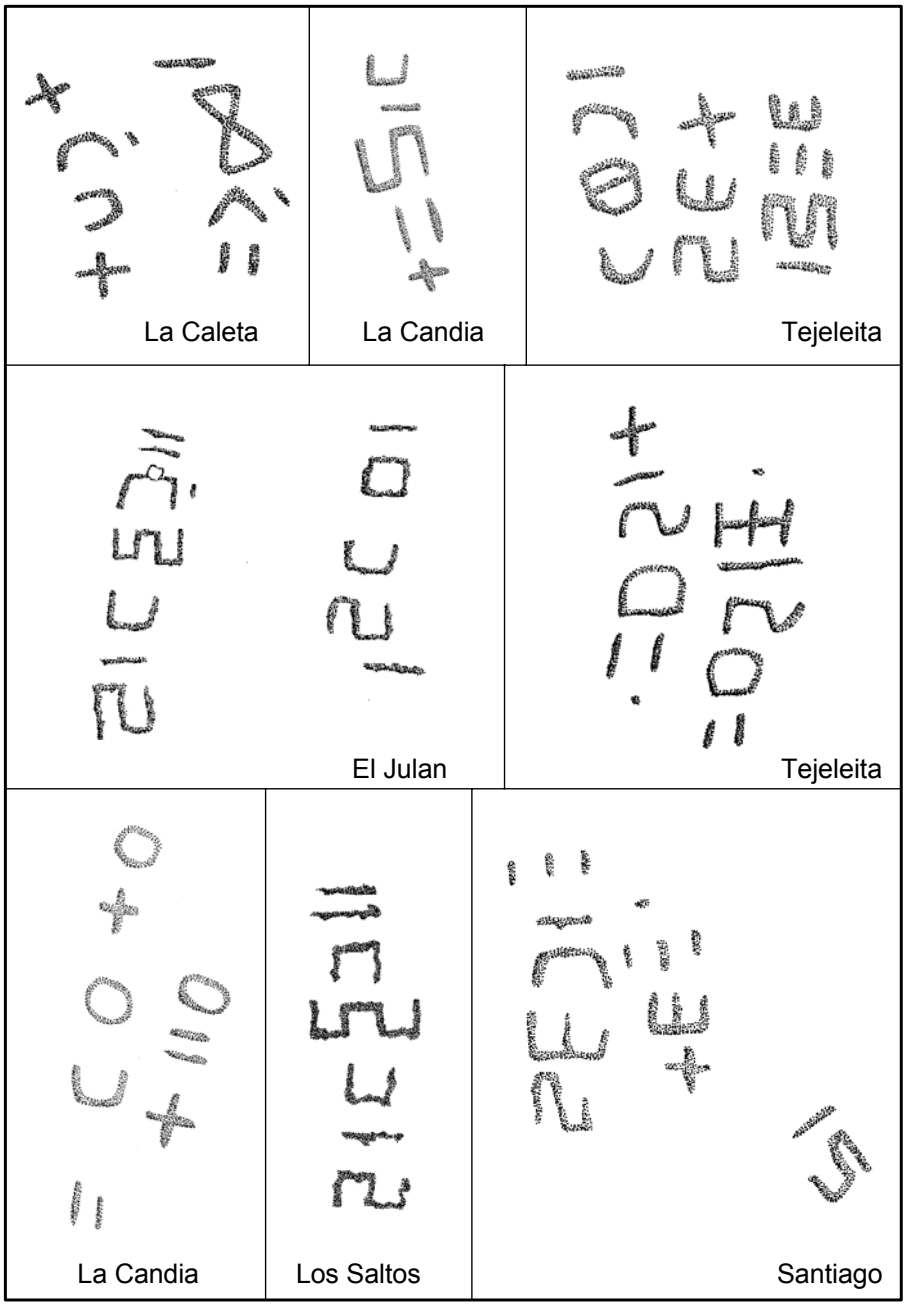


Fig. 32. Examples of archaic script from El Hierro

Arnaiz/Alonso (2000:214) cite an archaeological investigation of the Cueva de Arena (Barranco Hondo/Tenerife): the C^{14} dating established proof of a human settlement at c. 540 BC.
The necropolis of Arteara (Gran Canaria) is dated back to the fifth century BC. Inside this large necropolis a panel was found with a series of anthropomorphic figures in the context of LB inscriptions (Navarro et al. 2003).
For the British archaeologist Eddy the arrival of *"various Berber groups"* had started by c. 500 BC (1994:117).

There is no doubt that the same type of script has been used in these three regions Morocco, Kabylia and El Hierro. We have only small gaps in the documentation: ⵃ is not attested in the Kabylia, ⵟ not in Morocco. The only deviation consists in the regionally different use of variants: eg. ⵅ in the Kabylia, ⵠ in Morocco and ⵓ on El Hierro for the basic form ⵡ (=/p/f/).
If we take into consideration the enormous geographical distances between the Canary Islands and the Kabylia and the resulting diversifications of languages/dialects in this region the alphabets show an astonishing homogeneity.
No results were obtained from the search for archaic inscriptions outside these three main areas, apart from one exception. Some inscriptions from western Algeria look exactly as if they belonged to this group. The site of Ksar Barebi, four kilometres south of Taghit was cited first by Flamand (1921:77-79) and documented by Springer (1998). The script lines show totally geometric signs of archaic appearance. The existence of two short horizontal lines of script does not seem to be a valid counterargument.
Proof of archaic inscriptions in the Sahara Atlas would be the natural catalyst for a distribution from the High Atlas to Kabylia. We have some indications that this assumption is verifiable. Some panels do not contain any sign that contradicts an assignment to the archaic stage of development (e.g. from El-Hasbaia), but in total the body of evidence is not yet sufficient. This question, therefore, will be subject of a forthcoming study.

	MOROCCO	EL HIERRO	KABYLIA
B			
G			
D			
H			
W			
Z_1			
Ṭ			
Y			
K			
L			
M			
N			
S_1			
P/F			
S_2			
Q			
R			
S_3			
T			
Z_2			
S_4			
Z_3			

Fig. 33. Archaic alphabets (↑ direction of writing)

4.3 Classic script

There are only small differences between the archaic and the classic alphabets:

- there is some confusion in the signs for sibilants
- a sign for Q/GH is now attested.

However, the context of the inscriptions has changed radically: we no longer see archaic symbols, but there is a close association with Latin and Punic inscriptions.

If we take a look at the inscriptions of Fuerteventura, the change that has happened is immediately apparent. The writers of these lines come from a totally different North African world: they have control of two scripts! They feel that they belong to the great Roman Empire but they are still proud of their Libyan origin. This assumption is well attested by a group of inscriptions consisting of a personal name in Latin letters added by a vertical LB line "son of X". In 1993 I was fortunate enough to discover the first biscript of that kind (on the Cuchillete de Buenavista) presenting the declaration of personal origin in both scripts: TIMAMASIR, son of MAKURAN (Fig. 34).

What had happened in North Africa in the meantime? At the end of the sixth century BC Carthage had concluded a contract with Rome and thus had secured its monopoly on trade in the western Mediterranean for some centuries. During the third and second centuries BC two powerful empires arose east of the river Mulucha, the border to neighbouring Mauri: the empires of the Masaesyli and Massyli – together called the Numidian empires. It was not until the first century BC that the Romans took control of North Africa and divided it into Roman provinces. In the heyday of the Numidian era – the government of king Masinissa (206/203 – 148 BC) the LB script developed to the "official" script of the empire, and was used for monumental and grave inscriptions, in many cases together with Latin or Punic lines. Under the government of Augustus (27 BC – AD 14) the Roman colonization reached western Mauritania with colonies such as Tingis, Lixus or Zilis. The close union between Mauritanian and Roman politics and culture is embodies by king Juba II (25 BC – AD 23). He was a son of king Juba I, who after the defeat and death of his father enjoyed a first-class education in Rome, was married to Selene – daughter of Augustus and Cleopatra – and was finally appointed king of Mauritania. During his government Mauritania developed as the cultural centre of the western Mediterranean. In accordance with his diverse cultural fields of interest, Juba II visited with preference foreign countries and researched their cultures. Nowadays it is taken for granted that Juba reached the

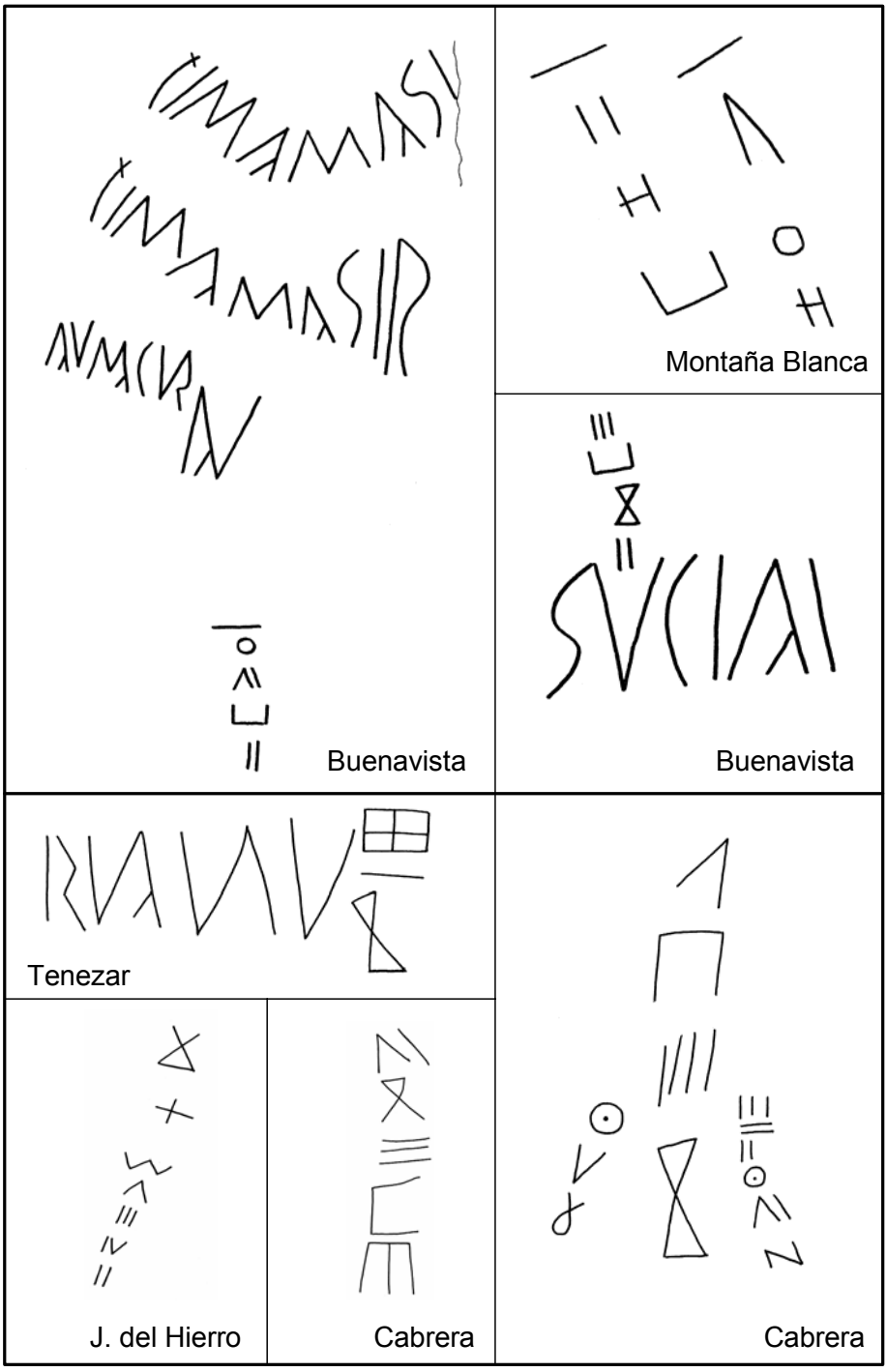


Fig. 34. Examples of classic script from Fuerteventura and Lanzarote

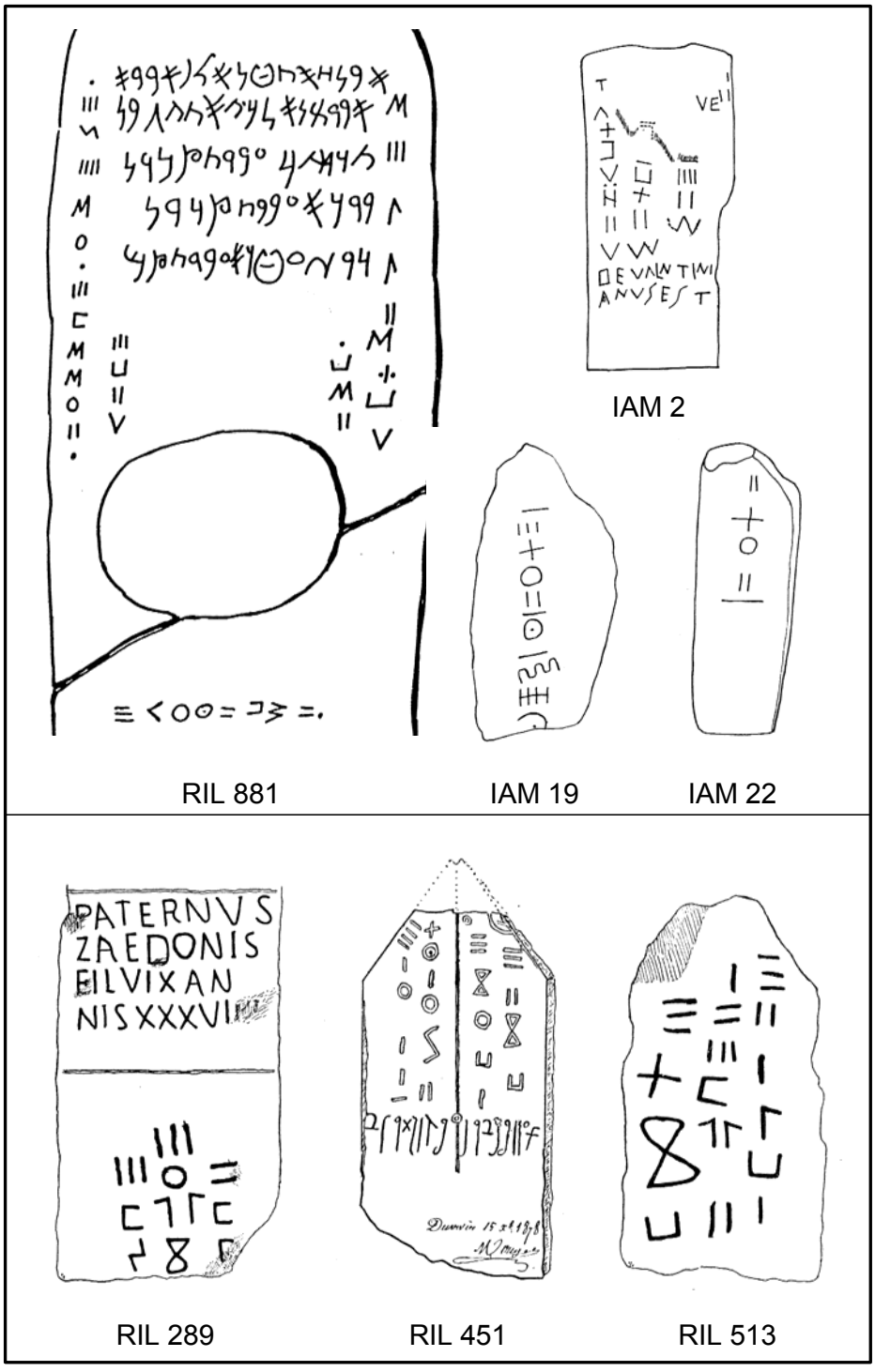


Fig. 35. Examples of classic script from Morocco and Algeria

Canary Islands in the course of his travels. He established a manufacture of crimson on the islands of Mogador (Insulae Pupurariae), probably also on the Canary Islands.
It is quite probable that the Latin cursive script together with the LB script in its classic form reached the eastern islands of the archipelago at that time. Particular details of the Latin capital-cursive writing used on Fuerteventura and Lanzarote are identical to the ones used in other periphery regions of the Roman Empire in the decades around the time of Christ's birth.

The overwhelming majority of classic inscriptions come from North Africa. In 1940 Chabot presented the basic corpus of 1123 inscriptions (RIL) mainly on grave stones and steles, while dozens of additional sites ranging from Morocco to Tunisia were published since then (Galand 1966, 1997b, 2001b, Ghaki 1986, 1991 etc.) – Figure 35.
With our present level of knowledge we are not able to establish whether the use of the classic LB script had its origin in the east or in the west of the Mauretanian/Numidian territory. It is a mere presumption on my part to choose to believe that this evolution started in the east.

The problem of two alphabets

Chabot (1940: IV) was the first to propose a division into two alphabets within the huge area of monumental and grave inscriptions:

- an oriental alphabet including the inscriptions of Dougga and the steles east of Seybouse with the frequent sequence ⊙ ׀ ⧖,
- an occidental alphabet including all inscriptions on steles west of Constantine with the frequent sequence ⋁⊏+ and *"plusieurs signes étrangers à l'alphabet oriental"*.

Chaker (1978/79:152) called the western alphabet a rural and domestic script, the eastern one an urban and semi-official script.
It is indeed tempting to connect this division with the two main kingdoms of the region: the eastern alphabet with the Massyles, the western one with the Masaesyles. This is exactly Rössler's position (Figure 36) and of some of his contemporaries (for the historical connections see Galand 1989b). Marcy proposed a similar division but with a different border and using other denominations (Figure 37).

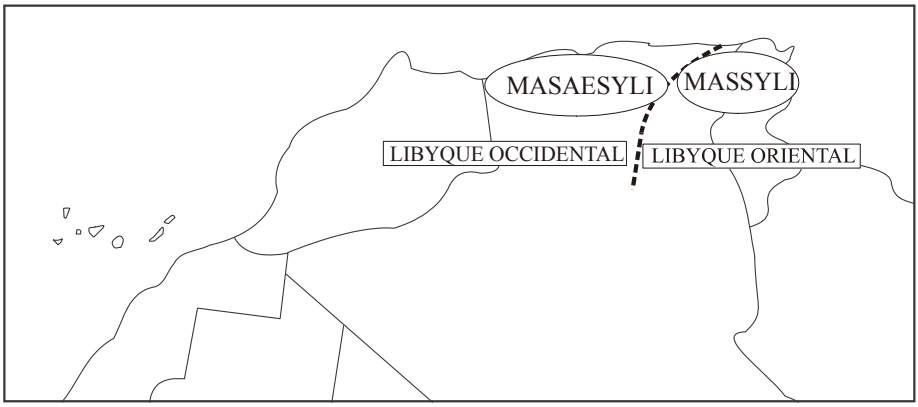


Fig. 36. Supposed division according to Rössler

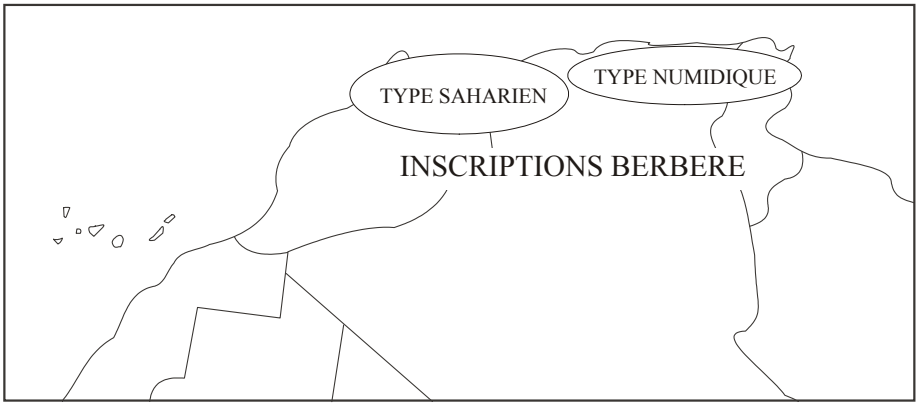


Fig. 37. Supposed division according to Marcy

We should refer to the "many strange signs" pointed out by Chabot. In essence he lists up 12 signs that occur in western inscriptions, but not in eastern ones. That seems to imply that these two complexes were totally different alphabets, which could be clearly distinguished. A detailed analysis shows that the situation is slightly more complex.

Most of the signs listed by Chabot are not at all typical for the western inscriptions and they occur only once or a few times. Such unusual and rare signs can occur for different reasons:

- local and/or personal variants
- personal errors in the writing
- errors in documentation.

This phenomenon can be observed throughout the world and is actually not a reason to propose a new alphabet. So there remain only four signs whose distribution is interesting and instructive: ⵯ ,ⵯ ,ⵗ ,ⵗ .

First, the differences concerning the frequency of the four signs in inscriptions of the classic period should be pointed out. The sign ⵯoccurs

approximately 70 times, while the signs 𐤎, 𐤅 and 𐤍 occur only 23, 10 and 6 times respectively over a distance of nearly 3000 km from the Canary Islands to Tunisia. From this point of view Galand's assumption of a separate "stripe alphabet" (alphabet au chevron) has a justifiable quantitative basis. Even if the frequency of the three rare signs may be corrected a little by new discoveries, they can never be classified as typical for a distinct alphabet. They are very rare but on the other hand, they cannot be classified as local variants because of their enormous distribution.

Second, we will examine the regional position of the signs regarding to the supposed division between a western and an eastern alphabet (Chaker 1984: 246): 40 % of the documented signs 𐤅, 50% of the signs 𐤍, 60 % of the signs 𐤅 and 78 % of the signs 𐤎 and are situated east of the supposed divide, and they therefore do not provide a convincing argument for a western alphabet.

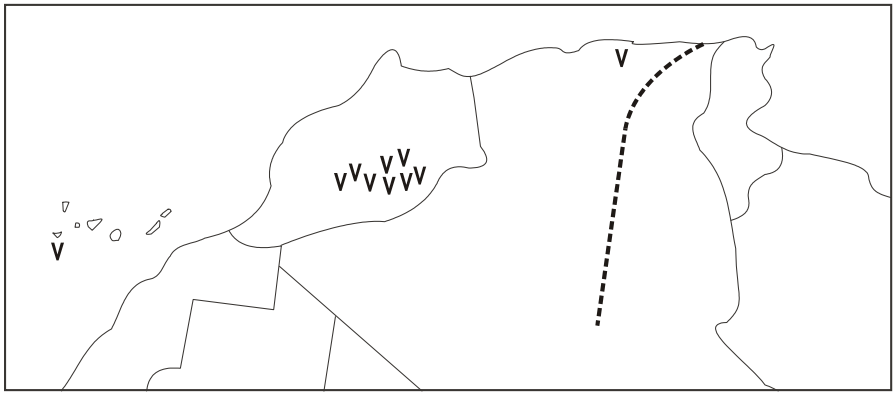


Fig. 38. Distribution of the sign V in archaic inscriptions

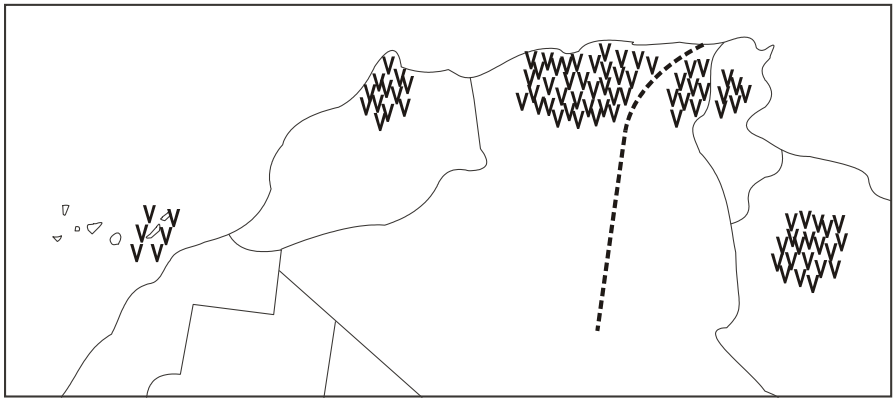


Fig. 39. Distribution of the sign V in classic inscriptions

Two additional facts call into question the division into a western and an eastern section:

1. The collection in the museum of Algier contains a stele from Kerfala, which presents inscriptions of the so called “eastern type” on the one side, the sequence ⵯⵔ+ on the other side (Galand 1989b).

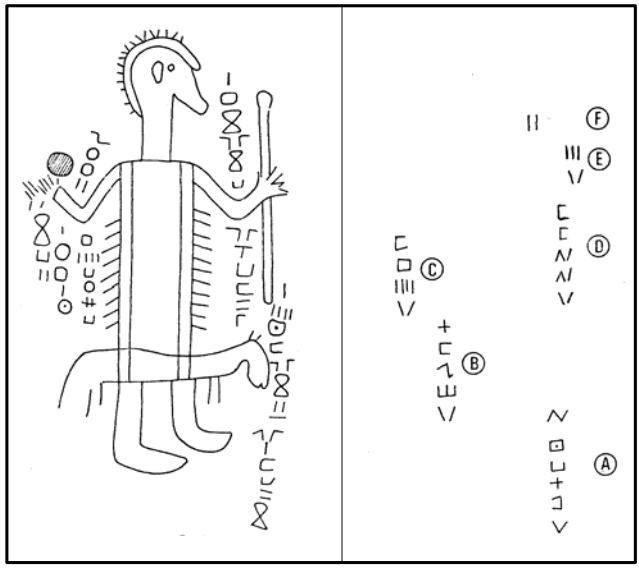


Fig. 40. Kerfala

2. An inscription from Sicca Veneria (Le Kef) presents the sequence ⵯⵔ+ plus four more signs ⵯ. This site is located in Tunisia not far from Dougga, i.e. in the centre of the supposed “eastern area” (Ghaki 1986).

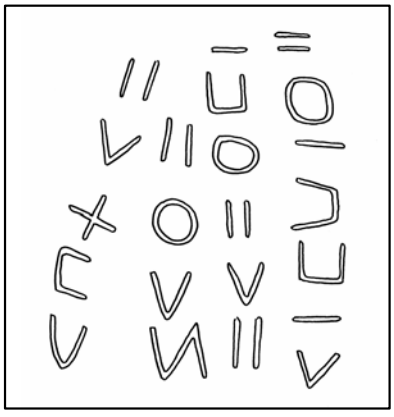


Fig. 41. Le Kef

Thus it is no surprise that today the majority of scholars do not insist on a separation into two large and homogenous areas of LB script.
Third, we must stress that the four signs are not an invention of classic writing. All of them are already present in archaic inscriptions, three of them on the Canary Islands and in Morocco, two of them in Kabylia.
How should we interpret these facts? The four signs were common in the west in archaic times and they spread all over the east during the classic period. The facts regarding the distribution of the sign ⋁ are not an invitation to propose an own “alphabet au chevron”.

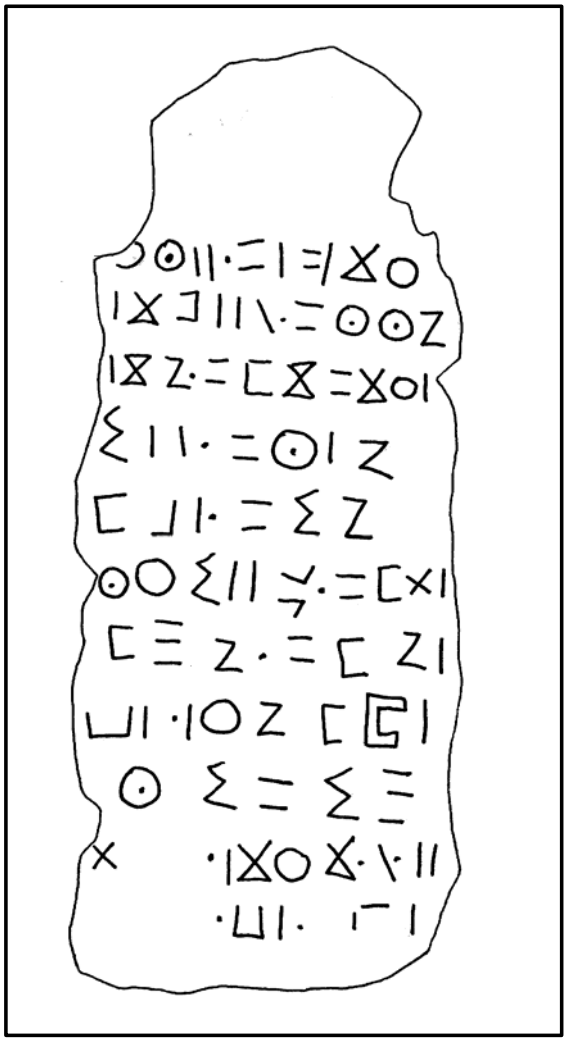


Fig. 42. Example of classic script at Dougga

The special position of Dougga

The most conspicuous characteristic of the LB inscriptions of Dougga is the fact that they are written in horizontal lines (from right to left) for the first time. This new way of writing was of course influenced by the Punic script, which is connected to LB lines in several cases. Moreover there are some other differences concerning the orientation or form of some signs:

Orientation:	⋊	instead of	⧖
	⋈		⧖
	∃		⊓
Form:	·|·	instead of	˙|˙
	∩		⧺
	ᛉ		⫼
New sign:	𐤑	= T3 (Galand) = T (Rössler) = Ti (Prasse)	

Fig. 43. Characteristics of the Dougga script

A quite astonishing situation at the signs for /t/ can be observed:

1. We do not know of a comparable alphabet with three totally different signs for /t/.
2. The strange sign 𐤑, which does not fit at all in the system of Libyco-Berber script, is the most frequent one (65 times), while the "normal" sign for /t/ (+) occurs only half as often (32 times). It could be influenced by the Punic sign for /ṭ/.
3. We cannot find an equivalent for the third sign (ᛉ) in the other Libyco-Berber alphabets as well. However, it could also have been influenced by the Punic script.

The special position of the classic inscriptions of the Canary Islands

As far as the alphabet is concerned, it is not possible to find really significant differences with the alphabets of the African continent. Signs representing the phonemes /q/ and /ṭ/ on Fuerteventura as well as on Lanzarote have still not been found. But something similar can be said about the collection of Moroccan inscriptions: no ⵃ, no ⵅ and no ⵜ.

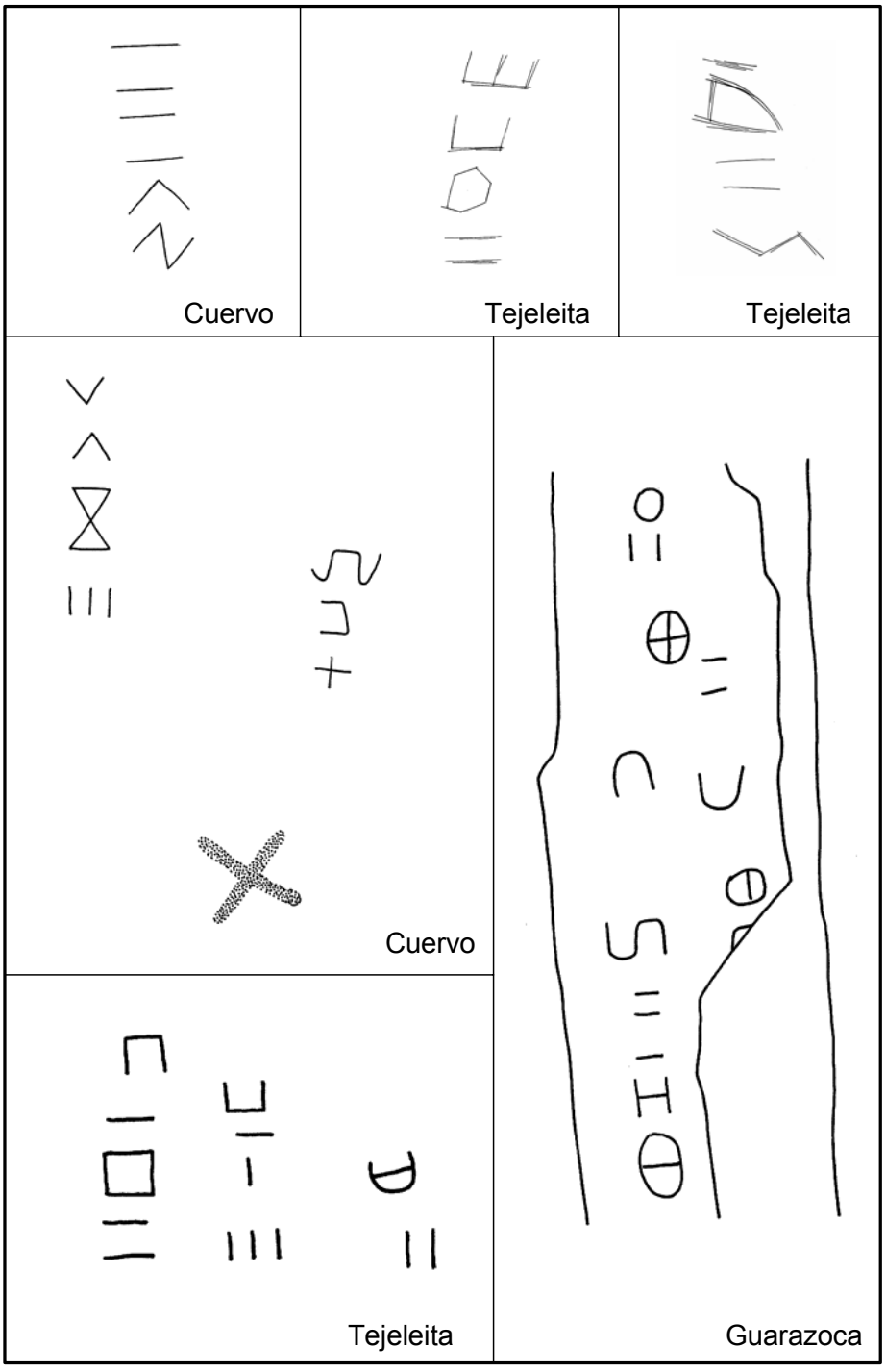


Fig. 44. Examples of classic script from El Hierro

Some new signs such as ⊕ and ⊞ do occur, which are probably not the Tifinagh bi-consonants for RT, but are most likely diverging variants for marking the centre of ○ and □.
The most striking difference in the Canary inscriptions in comparison to all others from that period is the fact that they are not placed on monuments or grave stones but on rock surfaces in the mountains of the islands. We find one extraordinary exception at El Hierro: the inscription of Guarazoca (Galand 1975). It was found on a pinewood board (chajasco = tablón funerario) in a necropolis cave. It is well imaginable that this inscription belongs to the classic group, especially in the context of a necropolis.
It should not be concealed that the C^{14} analysis of some of the bones in the necropolis resulted in a dating to c. AD 900, and that of the wood to c. AD 750, which both contradict our assignment of the inscription. If the C^{14} dating is correct, a plausible explanation may be that the tradition of classic writing survived on this remote island much longer than on the African continent.
In the last years we were able to discover some scratched lines on El Hierro, which do not look similar to the great majority of pecked lines. Even if they are not connected with Latin lines, they might be related to those at Fuerteventura and Lanzarote.

The orientation of ⁻ and |

In the LB script it is not possible to establish from a single line of script or even from a small number of lines if ⁻ or | means /n/ respectively /z/. This question can only be answered by statistical analysis of a greater number of lines (with 100 or more signs). This is based on the fact that in all the relevant languages/dialects of North Africa the phoneme /n/ belongs to the most frequent ones (10–15 %) while /z/ belongs to the seldom ones (2–4 %). It is thus easy to conclude that since the archaic script ⁻ was used for /n/ and | for /z/. Among the group of classic alphabets the situation is astonishing. It would be understandable if the only horizontal variant of writing (Dougga) held a unique position. However, the horizontal line (seen in the direction of writing) was used at Dougga for /n/ as well as in the westernmost region of Morocco and the Canary Islands. The exception is presented by the whole corpus of grave inscriptions from Tunisia to western Algeria collected in RIL (Chabot 1940): | for /n/. Nobody knows why this 90° turn took place among more than 1000 inscriptions. Do they present a separate period of evolution, unconnected to all other classic inscriptions?

Even accepting that grave inscriptions can be extremely stereotyped and repetitive, this is not a sufficient explanation for the inversion of the frequency.

The inscriptions of Tripolitania

There are good indications that the classic form of LB script spread as far as the north of Libya. In the 1950s Reynolds, Brogan and Smith documented a group of inscriptions in the buildings and the tombs of Ghirza. Ghirza is a Roman frontier settlement in the pre-desert zone of Tripolitania. They called the script a *"version of the Libyan alphabet"* and concluded, form the age of the buildings, the context of Latin inscriptions and the differing patina that the lines derive from very different periods. Some could easily be of the same age as the buildings, some are apparently much more recent, and some might be recent graffiti by workmen. Neo-Punic inscriptions and ostraka of the region are supposed to date from the first and second century AD. Inscriptions in the Latin script and in a not Punic/not Latin language (a suggested Libyan language by Goodchild 1950) could originate from the late Roman period. The overwhelming majority of the personal names in these inscriptions are Libyan: Nimira, Nasif, Masukan etc. Some like Annobal are Punic, and from the second century on Latin names reflect the process of Romanization.
Looking at the LB inscriptions only from the point of view of the signs used in them, there is a small group which could resemble classic script: no dotted signs except some points for separating words, the usage of ||, ||| and ||||. Incidentally, it should also be mentioned that the sign ∨ some times occurs in this lines. In Brogan's opinion (Brogan; Smith 1984:250) they are *"no doubt ancient"* and probably of the fourth to sixth century AD, and perhaps even some centuries older. The Libyan name Nimira, which is attested above the door of the tomb "North A" in Latin script, can also be found in the LB lines (Brogan; Smith 1984:254/line 4).

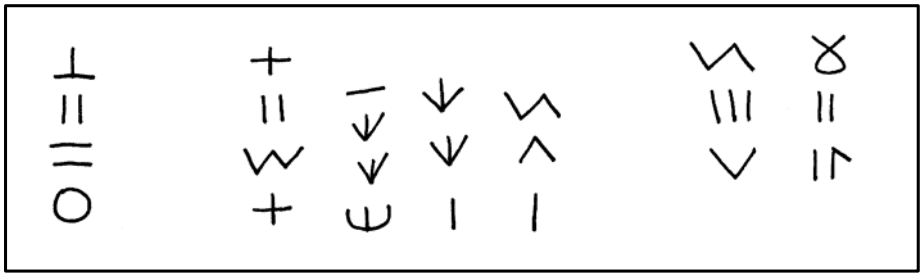
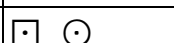
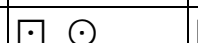
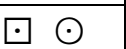
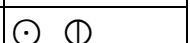
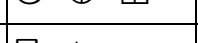
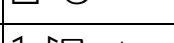
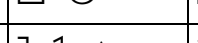
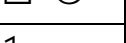
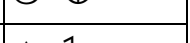


Fig. 45. Examples of classic script from Tripolitania

	FUE/LAN	IAM	RIL	DOU	TRI
B					
G					
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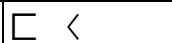
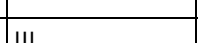
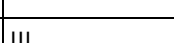
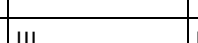
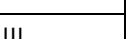
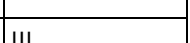
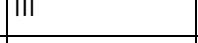
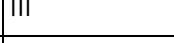
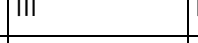
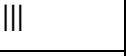
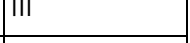
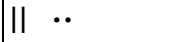
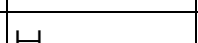
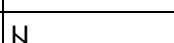
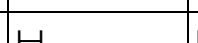
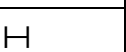
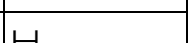
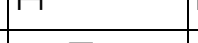
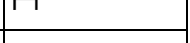
’					
W					
Z_1					
Ṭ					
Y					
K					
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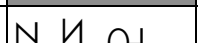
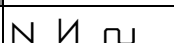
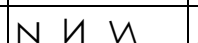
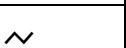
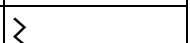
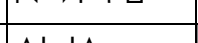
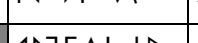
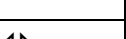
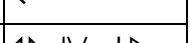
M					
N					
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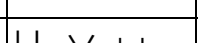
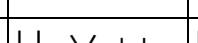
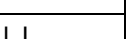
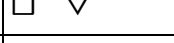
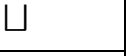
P/F					
S_2					
Q					
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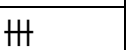
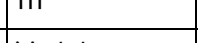
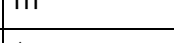
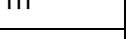
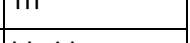
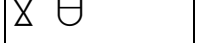
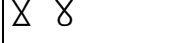
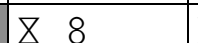
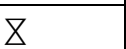
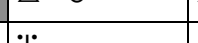
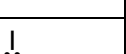
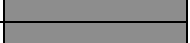
S_3					
T					
Z_2					
S_4					
Z_3					

Fig. 46. Classic alphabets (↑ direction of writing)

4.4 Transitional script

If we examine the evolution from the proto-alphabet to archaic and classic script, we find only minimal changes within the LB alphabet. Nearly all alterations of the signs can be classified as variants of the basic forms.
At some time – following a very smooth process over more than 500 years – a significant change took place. Only six signs kept their shape as well as their phonetic meaning. All the other phonemes were represented by completely new signs from that time onwards. There are strong indications that this was not a sudden act of innovation but a continuous process of transition. We do not yet know if this process took place in the whole of North Africa at the same time, or if there was a particular trend from the west to the east or vice versa. For the moment the best data to examine this transitional process come from the west (Morocco, Western Sahara, Mauritania).

Foum Chenna

The site Foum Chenna seems to provide the best example for examining details of this transition which occurred in the south of Morocco. It provides enough inscriptions (about 340 signs) as well as good facilities for a context analysis.
Briefly, the typical characteristics of the transitional script documented at Foum Chenna (Pichler 2000d) are as follows:

1. Typical Tifinagh signs like ⵅ, ⵀ , ⵡ , ⵟ or ⵠ do not yet appear.
2. The first dotted signs appear:
   ⁘ together with ⁞
   ⁙ together with ⁝
   and some examples of ∴ and ⁖ , but not yet ⁝ and ⁞.

The situation would be clear if we could separate older inscriptions with linear signs from more recent ones with dotted signs. But we can find linear and dotted signs on the same panel and even in the same line, and in one case one sign appears immediately after the other.
At this point it is necessary to examine the history of dotted signs. In archaic and classic script dotted signs like ⁘ or ⁙ were not common with the exception of • which was sometimes used for the separation of words respectively for the indication of not written letters (e.g. initial vowels). Among the documented inscriptions of the archaic type we find just one example of ⁘ and this one occurs – astonishingly – in the very inscription

of Azib n'Ikkis which is supposed to be one of the oldest lines in LB history. Let us examine this line in detail.

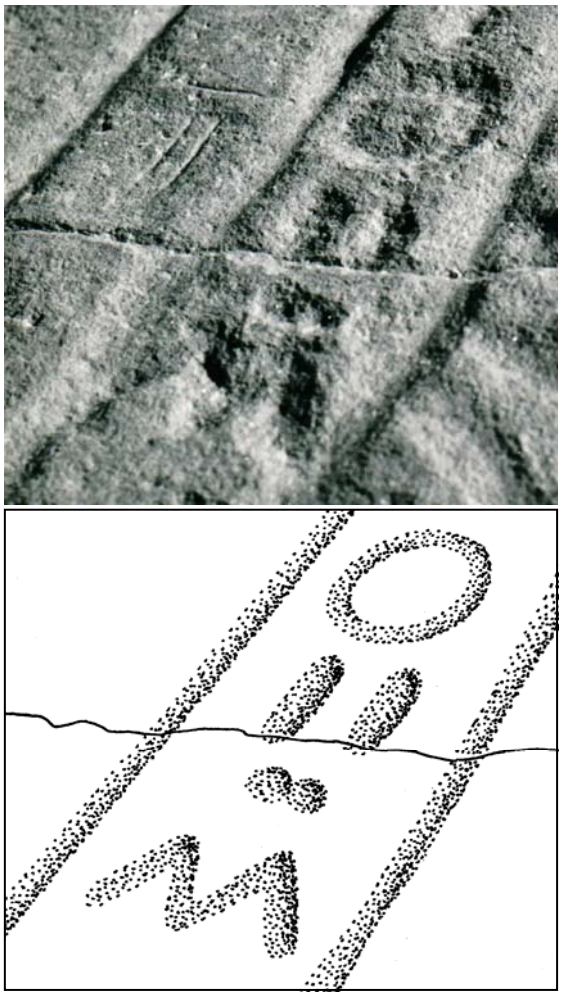


Fig. 47. Detail of Azib n'Ikkis

The first documentation by Malhomme and Galand (1960) presents some photographs and an epigraphic analysis. Galand describes exactly what can be seen at Malhomme's photographs: a horizontal sign, which seems to consist of two points. They are so close together that they can barely be separated. Galand does not believe that the Tifinagh sign for /w/ (⁚) would appear right next to the old LB sign for /w/ (ǁ), and he therefore does not exclude the probability of a line or of one point.

A year later there was an astonishing about-turn. In his documentation of the rock art of the High Atlas, Malhomme (1961) presents the part of the inscription in question with two points *and* one horizontal line. This line is not man-made, but it is part of a long fissure that passes through the whole surface of the rock panel. Unfortunately this incorrect version survived in most of the subsequent publications. Even more unfortunately this section of the inscription can no longer be examined because it has splintered off. Figure 24 illustrates the most probable appearance of the inscription obtained by computer analysis of Malhomme's original photographs, and Figure 47 shows the detail in question.

For the problem of the possible dotted signs I propose the following solution:

1. It is highly improbable that this sign represents ⁘ = /w/
2. It is too short to represent a horizontal line (compared with the lines in the upper part of the inscription)
3. The most probable version is that of ⁘ = a separation of words.

This assumption is supported by an observation of the inscriptions on Moroccan steles. The habit of separating the sequence ⵯⵛ+ from the rest of the script line with a point in inscriptions on steles in central and western Algeria (RIL 839 etc.) is confirmed in Morocco by the example of IAM 15. But in at least three cases (IAM 2, 8, 36) the sequence is separated by ⁘. The equation of • and ⁘ would lead to a very plausible linguistic interpretation of Azib 2: two filiations with personal names that are well attested in Morocco (W-SS and W-RTHL are separated by ⁘ (incidentally, W-SS is identical to one line from Msemrir – see Figure 27).

Among the thousands of classic LB lines, dotted signs were also quite unusual. RIL records only four example of ⁘ (99, 272, 960, 1018) – it is not sure that these copies are accurate – and no example of ⁙ and ⁜.

Let us return to the analysis of the inscriptions of Foum Chenna:

	LB	Tifinagh
W	‖	⁘
ʾ	‖‖	⁜
Ṯ	‖‖	ⵟ
ɣ	÷	⁙

Fig. 48. Comparison of LB and Tifinagh signs

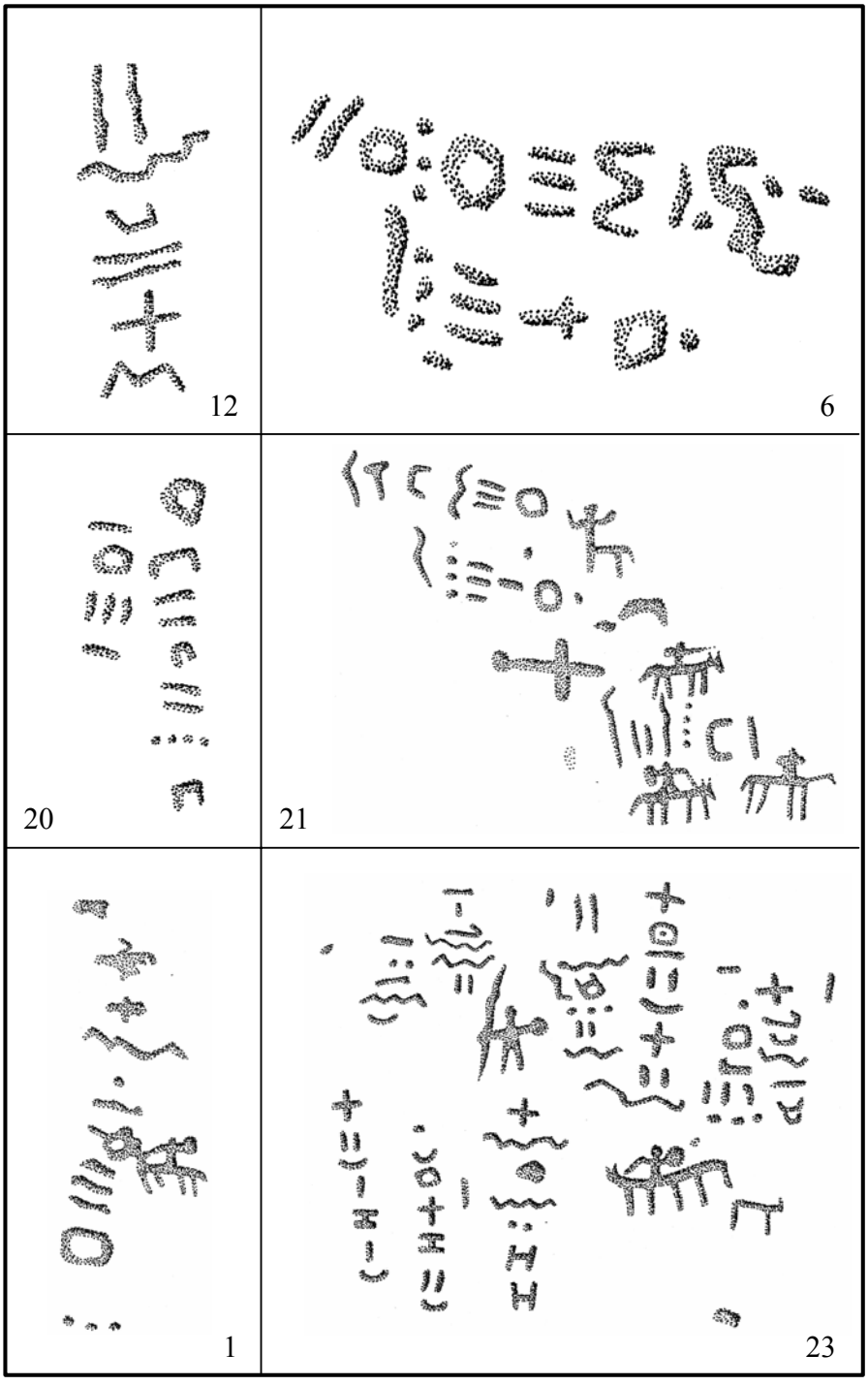


Fig. 49. Inscriptions in transitional alphabet from Foum Chenna

About ‖ and ⁘:
Nearly everything points to the assertion that these two signs indicate the same phoneme (W). One can recognize several examples of transition from long lines over short lines to dots. Even in modern Tifinagh writing dots were sometimes replaced by short lines: =|=− = AWA NEK (Aghali-Zakara 2004a:2)
The same thing is attested at the "Messages touaregs au Père de Foucauld": lettre no. 6 shows a sign with four short lines instead of points (Galand 1999a).
Aghali-Zakara supposes that this decision – lines or points – is dependant on the actual conditions of writing. A point is normally formed with the tip of one's finger in the sand, while on rock surfaces – especially if they are not smooth – lines are easier to form and more visible.
The statistical analysis confirms the phonetic identity of ‖ and ⁘: only together they reach a normal frequency of about 8 %.

About ⁞ and ⋮:
In correct orthography ⁞ is used only in final position. That means that ⁞ inside a longer line of script may indicate the separation of two words. The RIL collection also includes a few examples for ⁞ in initial position – six according to Lafuente (1957:388) – and about a hundred examples for medial position. Rössler (1958:96) interprets this as an influence of Punic habits of writing.
There is an enormous spectrum of opinions concerning the phonetic value of the sign ⁞:

Chabot, Prasse	H
Mauny, Marcy	$\bar{G}$
Meinhof	g/Q
Mukarowsky	GH/Q
Basset	I
Delgado	Y
Rössler	laryngal
Galand	final vowel
Lafuente	punctuation/ final vowel
Chaker	velar
Fevrier	mater lectionis

Fig. 50. Phonetic value of ⁞

It is not easy to find evidence for most of these assumptions, but a useful exercise is the comparison of well-known personal names. North African biscripts provide some good examples:

RIL 31 MDYT ≡ = pun. MDYT**A**

RIL 451 NMRS ≡ = pun. NMRS**Y**

RIL 85 FWST 𐠈 = lat. FAUST**US**

For a few other names in LB inscriptions the Latin equivalent can easily be found:

RIL 632 𐠈 N 𐠈 = lat. HANN**O**

RIL 378 MNṬN ≡ = lat. MONTAN**US**

RIL 1116 SRBK ≡ = lat. SERBUC**A**

Thus the only assumption which can be maintained by comparison is that of 𐠈 as an indefinite final vowel (/y/, /a/ or /o/) including the equivalent for the Latin ending /us/. In any case it does not seem that 𐠈 stands for a consonant.

Since the discovery of some biscripts on the Canary Islands, we have an additional possibility of examination. The LB word 𐠃𐠗𐠈 is written in Latin letters several times AVAT**I** (Fuerteventura), once AVAT**A** (Lanzarote). For the LB line 𐠃𐠖𐠇𐠈 we find the Latin equivalent VASIM**A**. This is probably the same personal name that occurs in RIL 294. Therefore, since we have no other strong indication for another interpretation we should assume that 𐠈 is a sign for final vowels.

The greatest problem in interpreting the signs 𐠈 and ⋯ in lines of transition script is based in their co-existence in one line or even their direct succession:

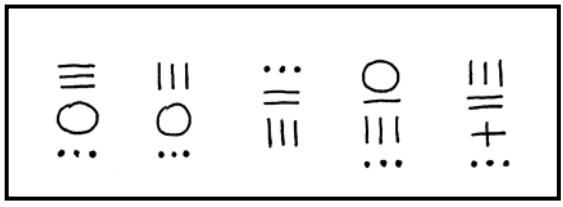


Fig. 51. Examples for co-existence

There are two possible of explanations:

1. 𐠈 = ⋯ = / ʾ /

2. 𐠈 =/ ʾ /, ⋯ = /**ɣ**/

As the sign 𐠈 normally stands for the vowel in final position it occurs nearly exclusive as the last sign of a line all over North Africa and the Canary Islands. At Foum Chenna we have established that 70 % of the

signs ⁘ and 80 % of the signs ⁞ are situated in the middle of a line. So the assertion ⁞ = final / ʾ / and ⁘ = /ɣ/ is not plausible. The statistical analysis confirms the identical value of ⁞ and ⁘. Only together do they reach a normal frequency of about 8 %.
But what to say about the direct succession? If this line at Foum Chenna is the only example it could be an error of the writer.

To ⁞⁞ and ⁙:
So far not one example of ⁞⁞ has been found at Foum Chenna. There are two possibilities of explanation:

1. ⁙ (instead of ⁞⁞) = /ṭ/
2. ⁙ = / ʾ /

It is very unlikely that ⁙ should be a third sign for / ʾ /. If this were so a sign for /ṭ/ would not exist at Foum Chenna; therefore the most plausible explanation is that ⁞⁞ was replaced by ⁙.

"Saharien ancien"

Several scholars (Foucault, Marcy, Mauny, Basset, Delgado, Prasse) have advanced the theory of a "saharien" or "saharien ancien" alphabet (Fig. 52) without dot-signs (with the one exception of ∴ in Marcy) and with signs like ⩸ (Basset, Prasse), ⌽ ◫ (Mauny), ⋋ (Mauny), ⩾ (Basset, Mauny, Prasse), ⩾ (Delgado, Prasse). In fact I have never seen a complex of inscriptions from the region Western Sahara/Mauritania with these characteristics. Of course there are some single lines without dotted signs (at Leyuad: Galand 1977:79 – Fig. 53) but this is not sufficient evidence to support the theory of a new alphabet. And I do not know of a single inscription from that region with one of the six signs listed above.
The greatest corpus of inscriptions was published by Monod (1938), some additional lines by Pellicer Catalán et al. (1974) and Galand (1977). The first come from the territory of Mauritania (Fig. 54), the others from the former "Spanish Sahara" (Fig. 53). These documentations present an alphabet that is very closely related to the one described as transition script of southern Morocco. The presence of ⁞ and ⁖, ⁞ and ⁘ is no great surprise, and neither is ⁙ in the first corpus, but there is no sign which could be termed typical for Tifinagh. Galand had already pointed out this intermediate position (1977:78): *"Les documents considérés n'appartiennent évidemment pas à l'épigraphie libyque classique, mais ils se distinguent également des graffiti récents"*.

	Foucauld 1920	Marcy 1936	Mauny 1954	Basset 1959	Delgado 1964	Prasse 1972
Y						
L						
M						
N						
R						
T						
G						
D						
W						
H						
B						
P/F						
Q						
Ṭ						
K						
$\bar{G}$						
γ						
G^w						
ñ						
vowel						
Š						
Ṣ						
Z						
Ẓ						
'S'						
?						

Fig. 52. Saharien ancien (↑ direction of writing)

Galand emphasizes to the numerous examples of the initial sequence ⋯ ○ ||| – respectively ···· ○ ||| – in Mauritania (Monod 1938: 99, 101, 103). These sequences, especially the first one, can be found among the lines of Western Sahara as well as at Foum Chenna. They are interpreted in a different way.

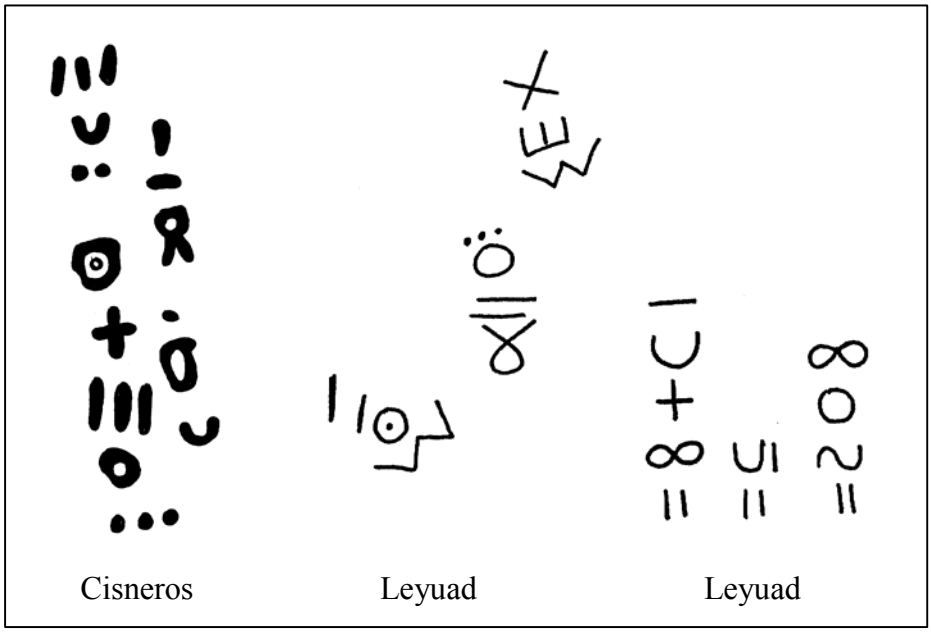


Fig. 53. Inscriptions in transitional alphabet from Western Sahara

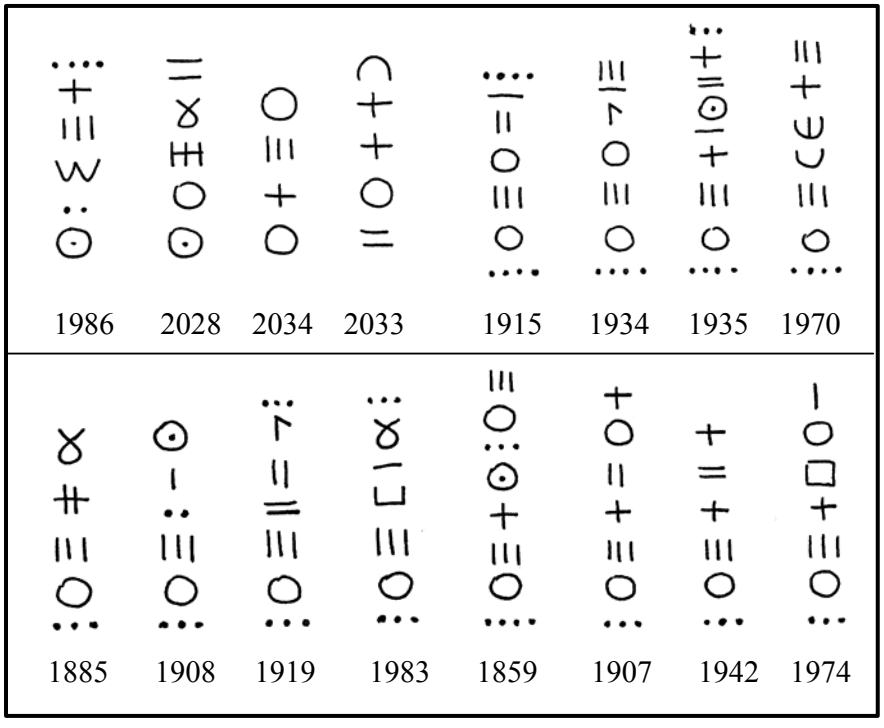


Fig. 54. Inscriptions in transitional alphabet from Mauritania

Marcy (at Monod 1938:98) reads the sequence ⁘ ○ ||| as "ġriy" = "I have/possess" followed by a noun referring to an object. Delgado (1964) takes over this translation and believes in being able to read the following letters as "capote" = cape, "madero" = wood, "camello" = camel, "anillo" = ring, "cobertor" = blanket etc. in the sense of a real or magic possession. The sequence ⁙ ○ ||| is read by Marcy as "riġ " = "I want".
For Aghali-Zakara the variations with points are identical to those using lines. He reads ⁘ ○ ||| as "əγreγ" = "I am called" and ⁙ ○ ||| as "əhureγ" = "je suis à la trace" = "I am following the track".
There is one more point to be made: ⁘ ○ ||| are often followed by the sign +, in some cases sequences with + −+, which are usually at Berber names and are supposed to be an indication of female gender (Février 1956:270). This concurs with Drouin's remark that ⁙ ○ ||| is followed by a personal name, normally a female one (1999:3).

"Saharanian alphabet"

When the theory (supposed alphabets) and the practical experience (analysis of documented signs) are compared, a deep rift is apparent. Figure 52 shows several alphabets published during the last seventy years and Figure 62 shows the result of the analysis of inscriptions from Morocco, the Western Sahara and Mauritania. Apart from the six "constant signs" which never changed, there is agreement only on four further signs: G, D, W and H. All the others are interpreted in very different ways, and there is utter confusion where sibilants are concerned. The number of signs assigned to this group of phonemes ranges from two (Marcy) to eleven (Prasse) and twelve (Delgado). Astonishingly, Delgado is the only one to note the existence of the signs ⁖ and ⁘ together with ‖ and |||.
It is in the signs for B that one can best perceive the status of transition. Some authors consider ⊡ to be the sign for B (as in archaic and classic script), others consider it to be a sign for S (as later on in Tifinagh).
In view of the results obtained from the analysis of inscriptions from Morocco and the Western Sahara it is now possible to list the characteristics of the transition script:

1. the presence of dotted signs *together with* linear signs
2. the presence of the signs ⩛ /∪ and ⧺
3. the presence of the sequence ⁘ ○ |||
4. the absence of the dotted signs ⁝ and ⁚

5. the absence of "complicated" Tifinagh signs like ⵣ, ⵄ , ⵡ , ⵂ or ⵅ
6. the absence of the sequence ⵔ∴ / ∴ⵔ∴

Based on this definition we can search for inscriptions in other regions of North Africa and the Sahara, which fulfil these criteria. The following will of course only be an overview and does not constitute a complete list.
First a brief comment about the Canary Islands is called for. At the site Llano de Zonzamas/Lanzarote (Ulbrich 1991:105) the sequence ⋯ ○ ||| was documented, but in reverse order (to read from top to bottom?). However, this is the only line of this type, and it therefore cannot be taken as evidence that the transition script ever reached the archipelago.

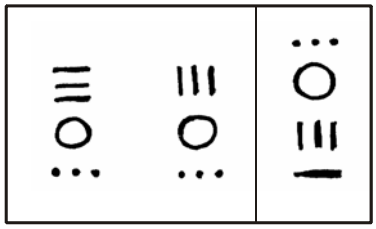


Fig. 55. Comparison Foum Chenna - Zonzamas

Evidence for the transitional script covers a great part of the Sahara and its northern surrounding areas. There are excellent examples from southern Morocco, the Western Sahara and Mauritania as well as from the Sahara Atlas, southern Algeria, Adrar and Air. Some suggestions of its existence have been found in Tassili and Messak as well as in some areas of northern Libya (Wadi Zreda, Tripolitania). The uncertainty concerning these regions is most likely the result of too small a base of documented inscriptions available for this analysis. Taking into account the enormous region of distribution the traditional term "Saharanian" would seem quite convincing.
The context of these inscriptions is very similar in all regions cited above: there are no large wild animals, herds of cattle, or animals of the so-called "Tazina-style", but large numbers of horses and camels and other fauna, mainly consisting of oryx, ostrich etc. and "Libyan warriors".
Several researchers of the Sahara have reported that local Twareg people distinguish between Saharan rock inscriptions that they can read from those they cannot read. I would like to propose the thesis that this line of division is identical with the border between Tifinagh and transitional script.

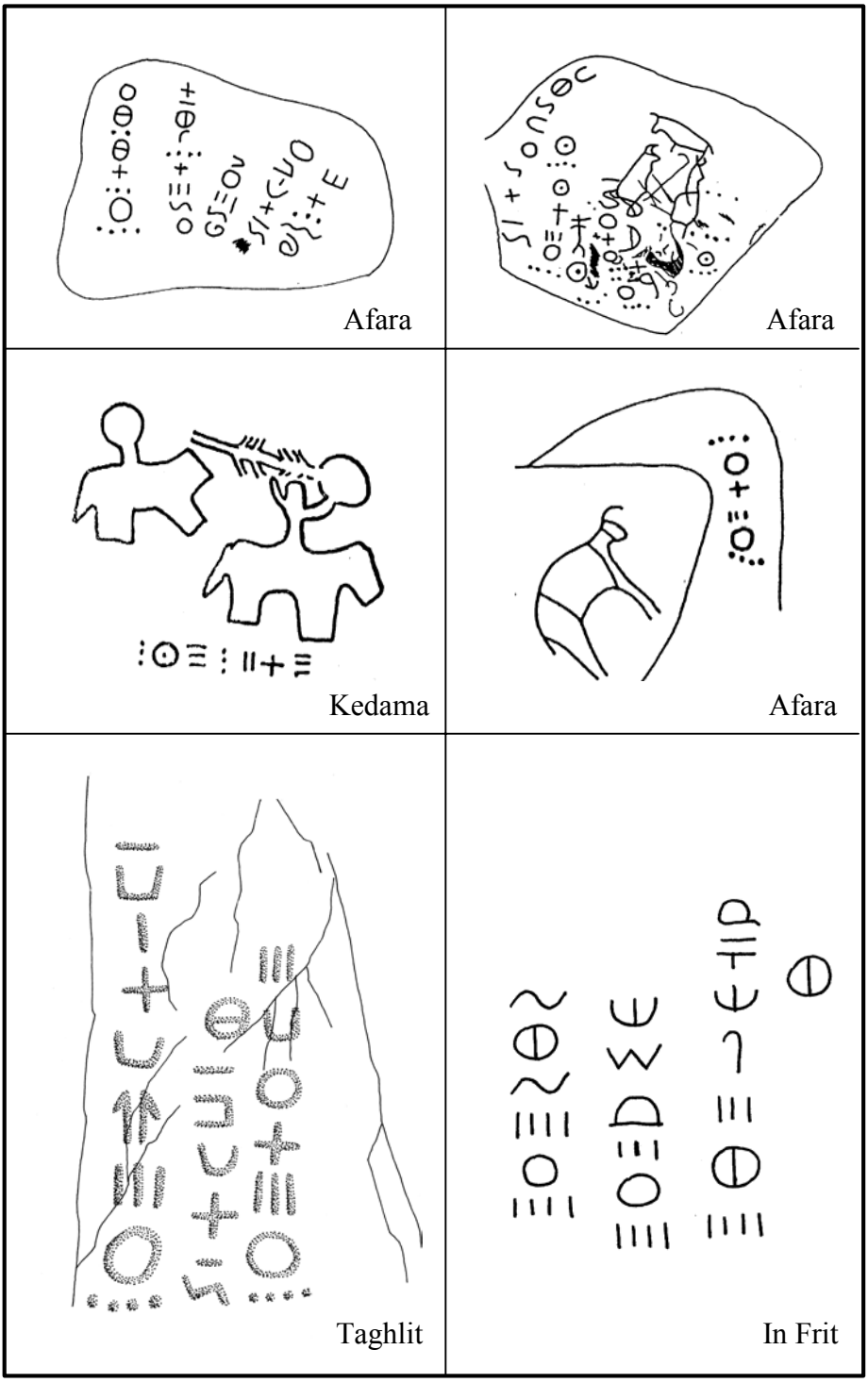


Fig. 56. Inscriptions in transitional alphabet from Adrar

Fig. 57. Inscriptions in transitional alphabet from Ahaggar

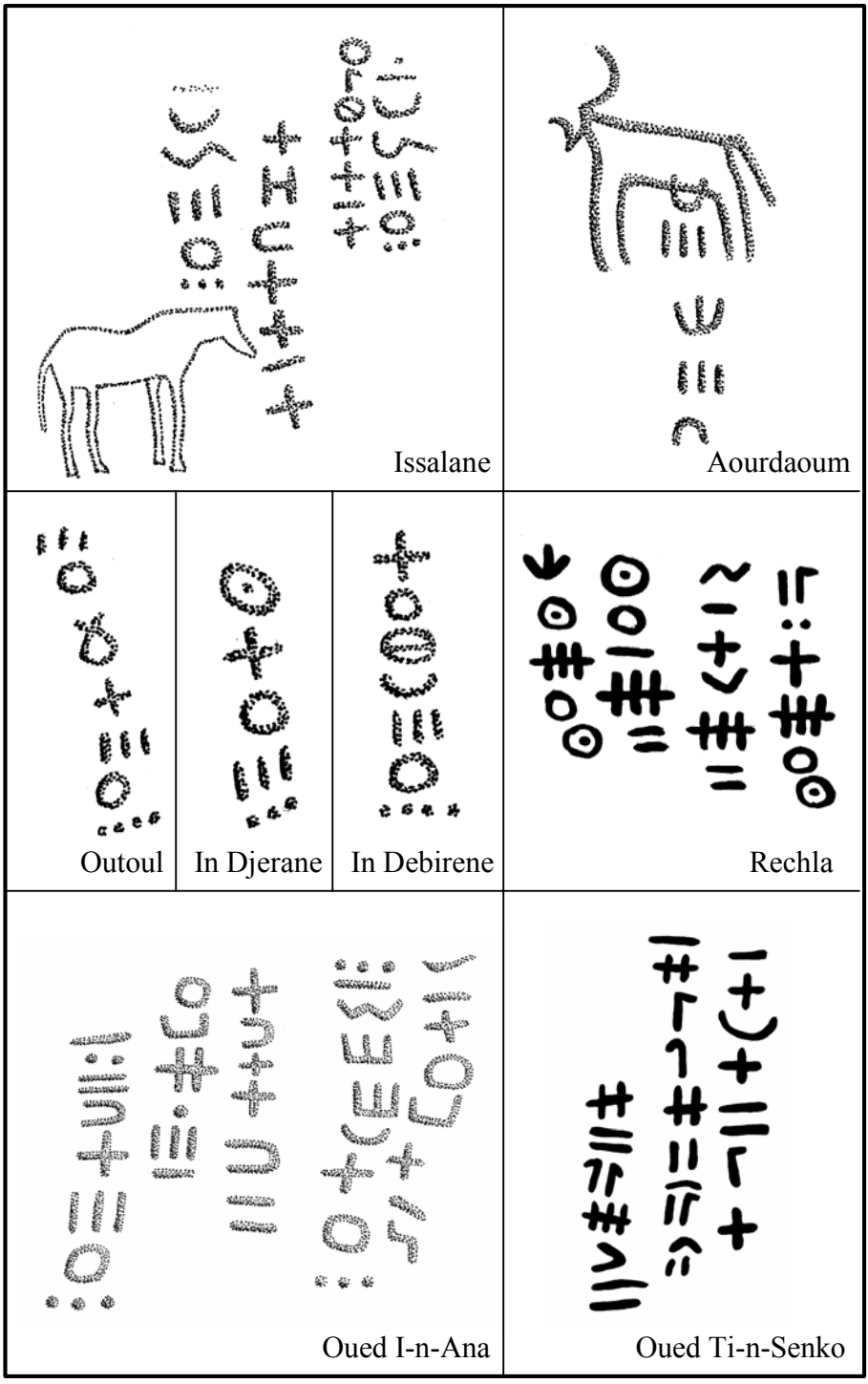


Fig. 58. Inscriptions in transitional alphabet from southern Algeria

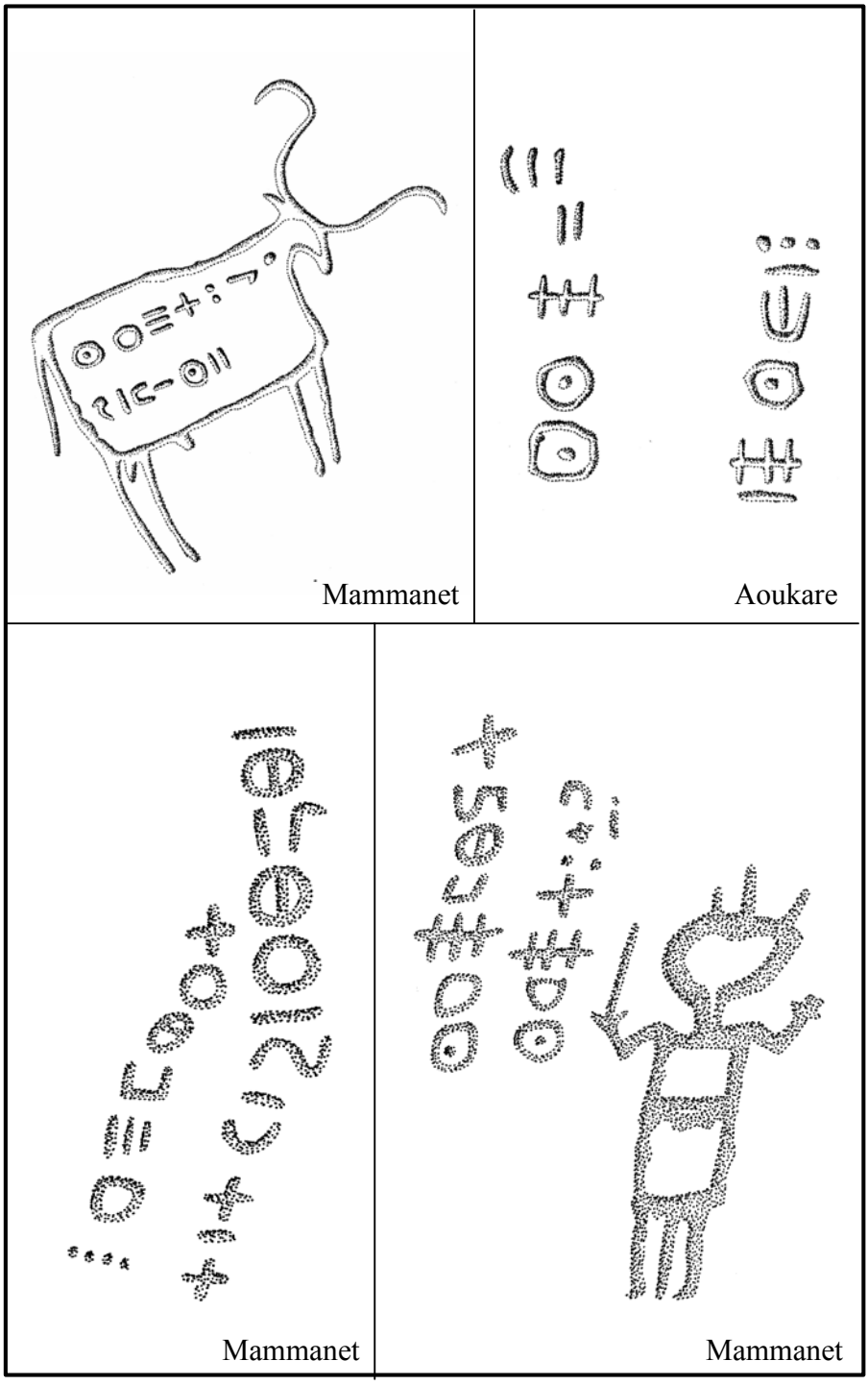


Fig. 59 Inscriptions in transitional alphabet from Air

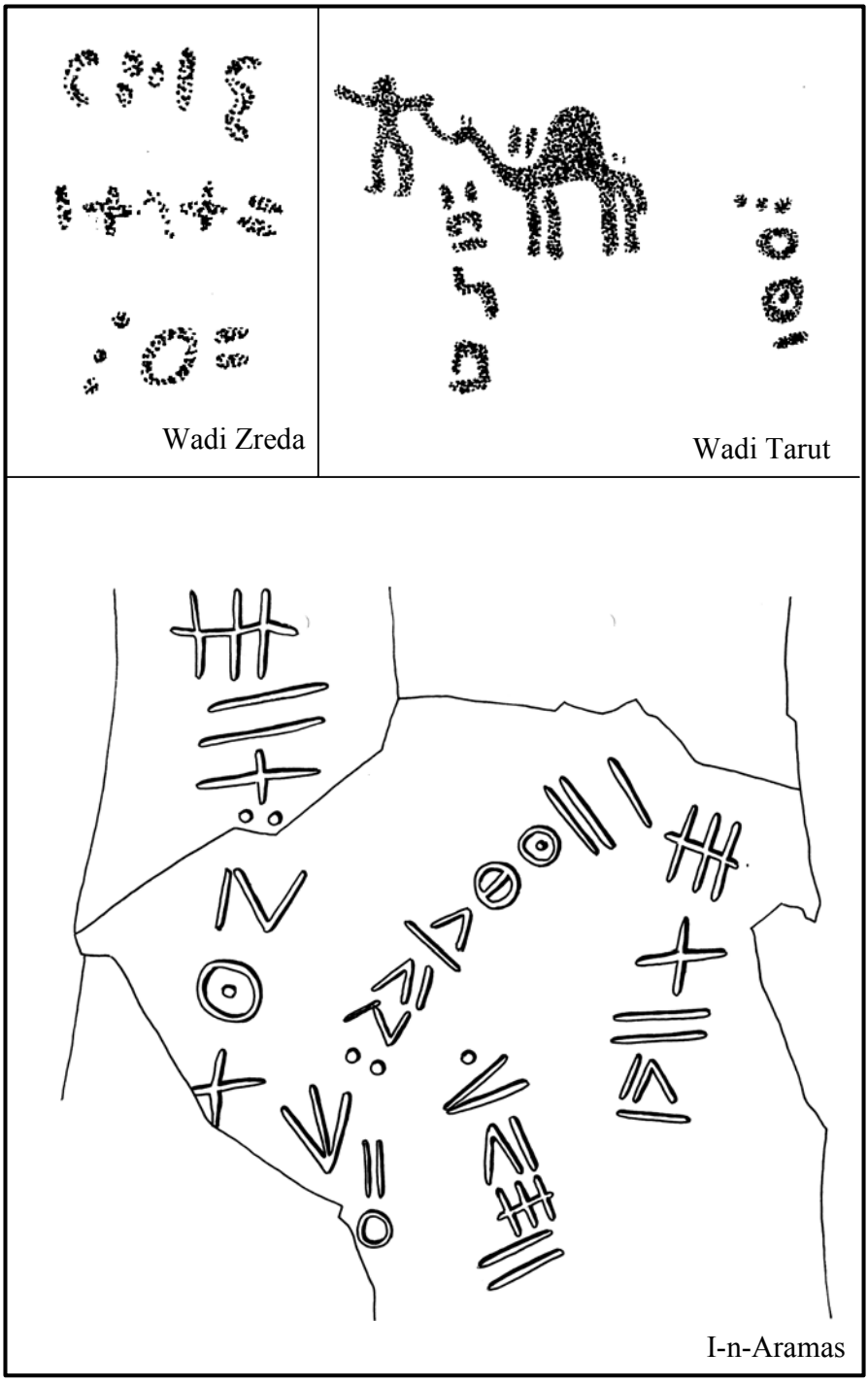


Fig. 60. Inscriptions in transitional alphabet from Libya

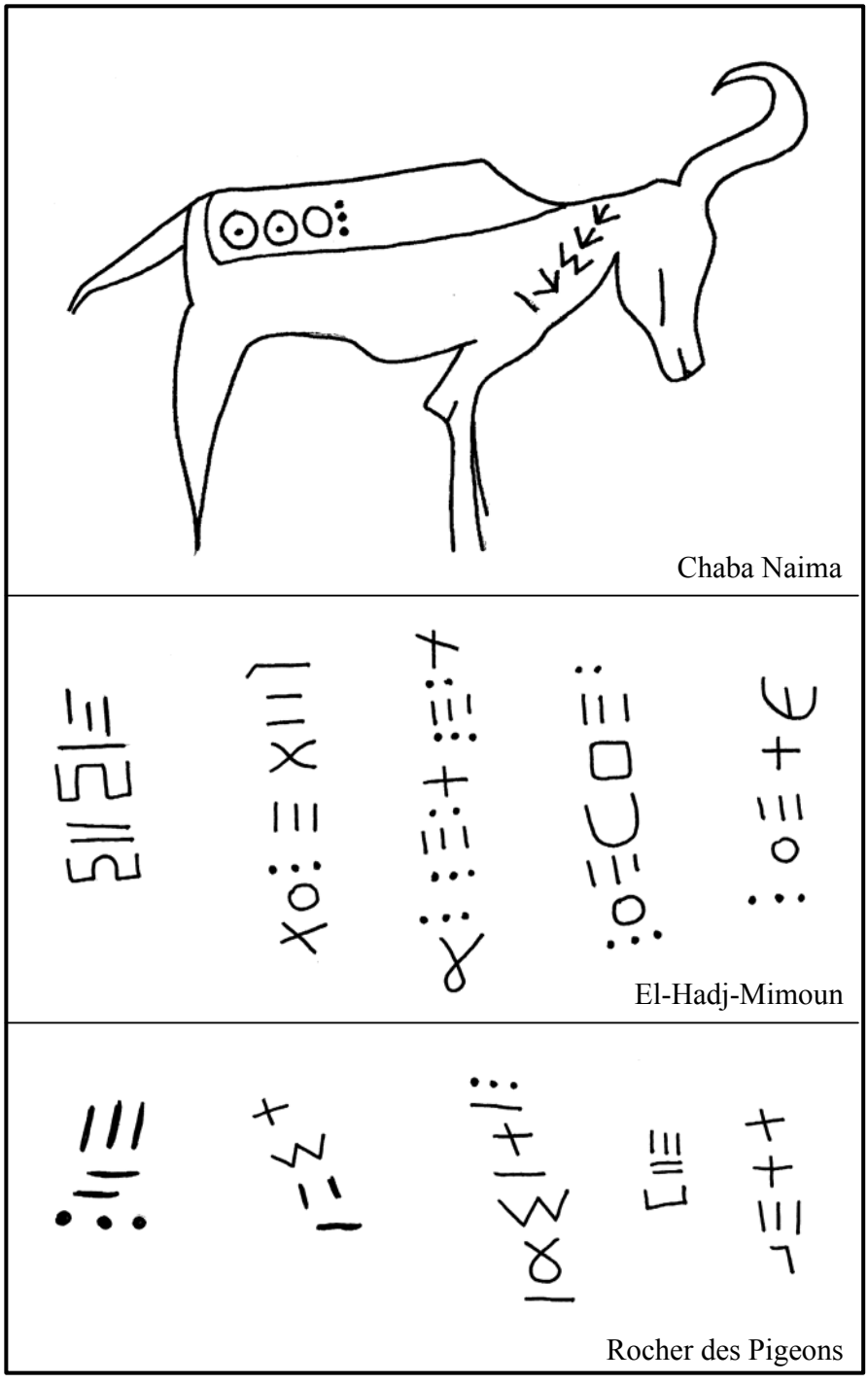


Fig. 61. Inscriptions in transitional alphabet from the Sahara Atlas

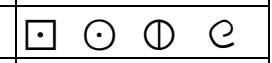
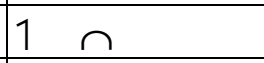
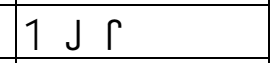
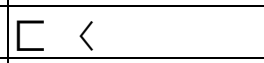
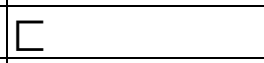
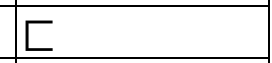
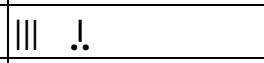
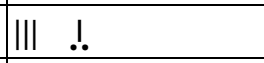
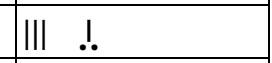
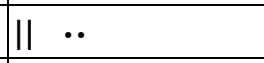
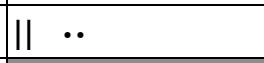
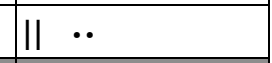
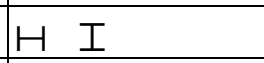
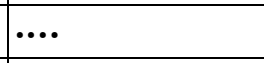
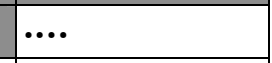
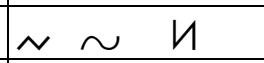
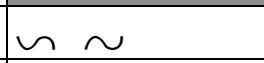
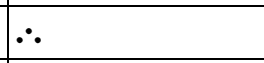
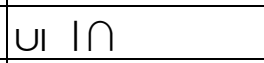
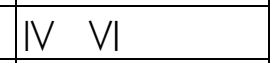
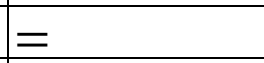
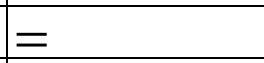
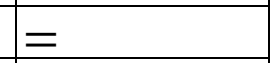
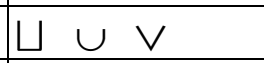
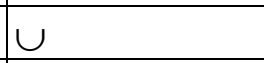
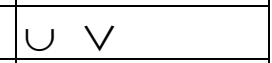
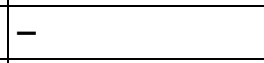
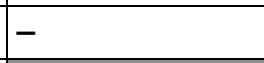
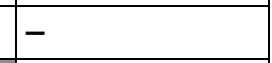
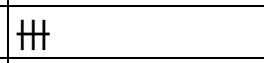
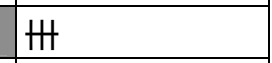
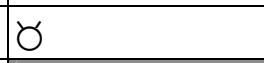
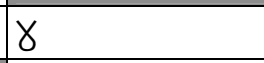
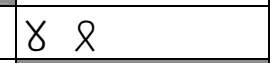
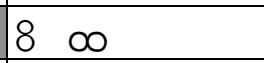
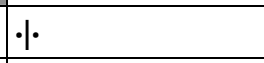
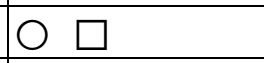
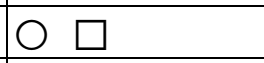
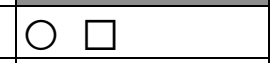
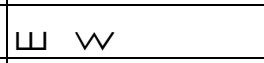
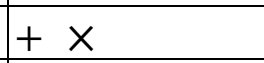
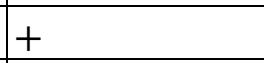
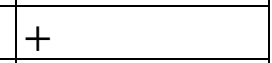
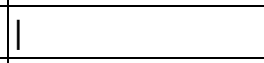
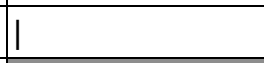
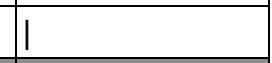
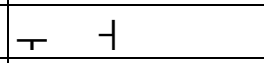
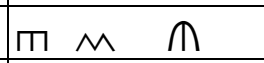
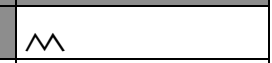
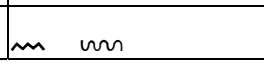
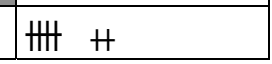
	MOROCCO	W-SAHARA	MAURITANIA
B			
G			
D			
’			
W			
Z_1			
Ṯ			
Y			
K			
L			
M			
N			
S_1			
P/F			
S_2			
Q			
R			
S_3			
T			
Z_2			
S_4			
Z_3			
?			

Fig. 62. Transitional alphabets (↑ direction of writing)

4.5 Tifinagh

In general the most remarkable features of the LB script are stability and the maintaining of tradition over long periods. But at some point there was a major break in the chain of tradition. We do not know the reason (socio-cultural circumstances) for this, but there was a great change in the structure of the alphabet that justifies giving this type of script a new name.

Many thousands of Tifinagh rock inscriptions are spread all over the whole territory of the Sahara, except of course the regions of pure sand desert: from Adrar, Ahaggar, Tassili, and Air to Acacus, Djado and Fezzan. Dozens of rock art researchers have collected a huge corpus of inscriptions.

Unfortunately there is no comprehensive collection that is available to the public as well as to researchers. Nevertheless the basic characteristics of the Tifinagh script can be clearly seen from the example of the traditional Twareg script of the Ahaggar:

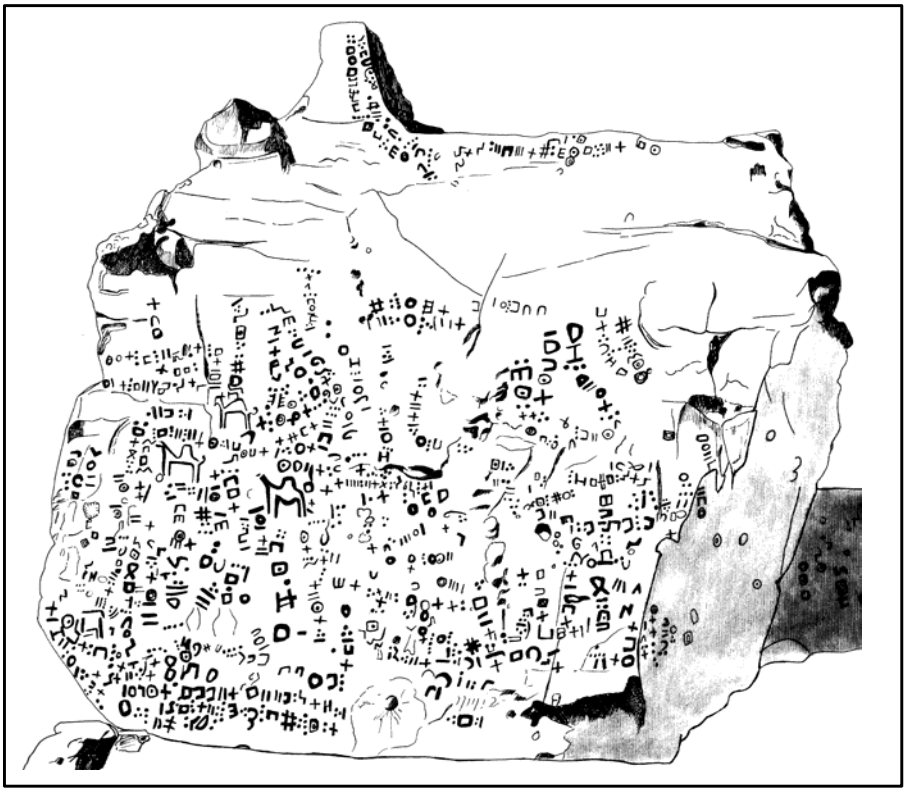


Fig. 63. Tifinagh inscriptions at WadiI-n-Taborak/Libya

1. Only six signs kept their form and phonetic value:
   ⵍ, ⵎ, ⵏ, ⵔ, ⵙ, ⵡ ,
2. Some signs kept their form but changed their phonetic value:
   ⵒ /b/ → /s/
   ⵖ /f/ → /g/
   ⵣ /z/ → /ḍ/ etc.
3. Three groups of new signs were introduced:
   a. "complex" signs: ⵅ, ⵃ , ⵕ , ⵠ etc.
   b. dot-signs: ⵯ, ⵰, ⵱, ⵲, ⵳, ⵴
   c. signs for bi-consonants: ⵟⵒ , ⵟⵓ , ⵟⵅ , ⵟⵃ , ⵟⵜ etc.

In Tifinagh there is no restriction to one direction of writing. People say "ässhurud" = "there is no rule". Vertical writing from bottom to top is still classified as the original, authentic form of writing and is used predominantly by old people and women. Normally the direction from top to bottom is not used. Younger people who have learned Arabic and/or French at school write mainly in horizontal lines from left to right (which is supposed to be influenced by Latin writing) or from right to left (influenced by Arabic writing). Writing in circles or spirals is possible but rare. Typical "initial sequences" (like NK or WNK) and "open signs" (like ⵍ = direction ↑) are valuable indications for the reader to recognize the direction of writing.

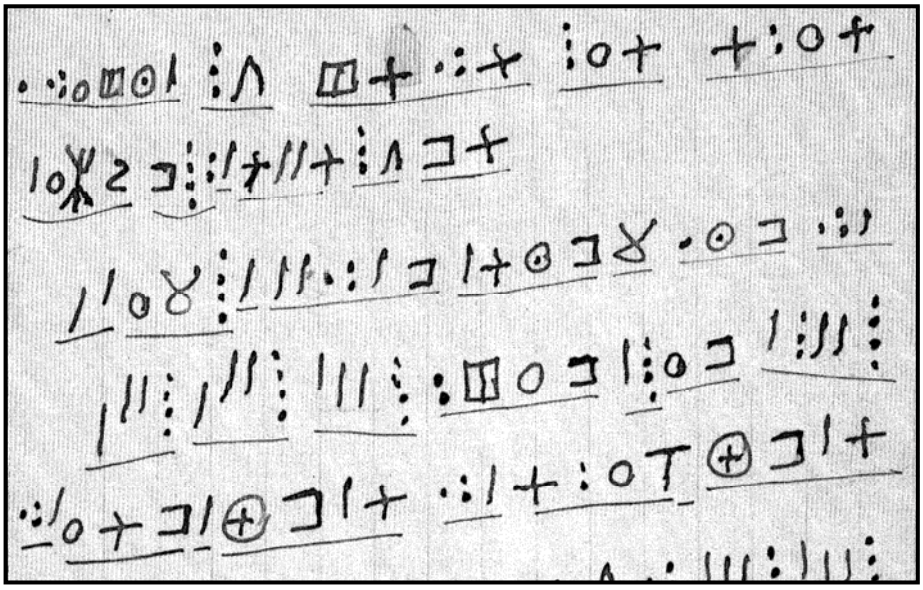


Fig. 64. Lettre 12 of "Lettres au Marabout" (Galand 1999a)

	AHAGGAR	AIR	ADGHAGH
A	ⵔ	ⵔ	ⵔ
B	ⵀ	ⵀ	ⵀ
D	ⵍ	ⵄ	ⵯ
Ḍ	ⵄ		
F	ⵃ	ⵃ	ⵊ
G	ⵅ	ⵖ	ⵖ
Gʸ	ⵖ	ⵊ	
ɣ	ⵗ	ⵛ	ⵗ
H	ⵘ	ⵘ	ⵘ
J	ⵊ	ⵜ	ⵣ
K	ⵛ	ⵛ	ⵛ
L	ⵍ	ⵍ	ⵍ
M	ⵎ	ⵎ	ⵎ
N	ⵏ	ⵏ	ⵏ
Nʸ	≠		
Q	ⵙ	ⵗ	ⵙ
R	ⵔ	ⵔ	ⵔ
S	ⵙ	ⵙ	ⵙ
Š	ⵛ	ⵛ	ⵠ
T	ⵜ	ⵜ	ⵜ
Ṭ	ⵟ		
W	ⵡ	ⵡ	ⵡ
X	ⵅ	ⵗ	ⵅ
Y	ⵢ	ⵢ	ⵦ
Z	ⵣ	ⵣ	?
Ẓ	ⵜ		ⵜ

Fig. 65. Examples of Tifinagh alphabets (→ direction of writing)

The learning of writing is not institutionalised, i.e. it is not taught in schools by teachers with standardized alphabets. It is learned from older children or relatives in the form of a game: someone draws a word into the sand and the others try to read it. Mnemonics, which contain nearly all the letters, were only documented (Aghali-Zakara; Drouin 1988:101) in two regions (Ahaggar and Azawagh/Mali). Foucauld (1920) reports that this "Fadimata-vers" existed as a rock inscription somewhere in Ajjer or between Ahaggar and Air. But there is no record of an alphabetic sequence.

If we consider the enormous area in which Tifinagh is used, it is no surprise that there are considerable regional differences, which go far beyond local variants of signs. Figure 68 shows that these differences very seldom consist of completely new signs. Mostly one and the same sign is assigned to different phonemes. Aghali-Zakara (1997:2-3) mentions about a dozen alphabets and up to 50 graphemes representing 23–27 phonemes. Despite this regional diversification there is a temporal development as well. With regard to a distinct definition of Tifinagh alphabets, it seems that the final decision has not yet been taken: different authors present different alphabets.

Within the framework of this book it is not possible to analyse all local and temporal variations of Tifinagh. I can only give a few examples, and the detailed analysis is left for special publications.

A first observation concerns the sign ⵖ (espèce de coquille, snail shell) which is not present in "normal" Tifinagh alphabets, but occurs in some regions such as southern Algeria or Messak and is in many cases part of the sequence ⵄⵅⵗ. Aghali-Zakara claimed this sign as a variant of ⵔ = B. A good indication for this interpretation is the sequence ⵄⵍⵍ+ⵍ which can easily be identified as the well-known personal name BLTN (BALLATAN). Aghali-Zakara reads the sequence ⵄⵅⵗ as "əbbuyeɣ" = "I am lonely/solitary".

There is a plausible explanation for the formation of this variant: when writing quickly e.g. with a finger in the sand, it is possible that the writer does not close the circle completely and extends the line towards the centre of the circle (ⵔ = ⵖ).

In practical writing there are four possibilities of orientation: ⵖⵄⵒⵣ. Gauthier (2003:38) has expressed the opinion that these different orientations are intentionally and indicate the direction of the line. But all four shapes can be found in vertical lines. This accords with thesis 1 (page 40) that all shapes of signs without an axe of symmetry are allographs of one grapheme.

Although there is not the slightest temporal connection, it should be mentioned here that 𐊹 in the Iberian alphabet of Espanca (Untermann 1997) is interpreted as a sign for /be/ (derived from the OP sign 𐊹 = B).

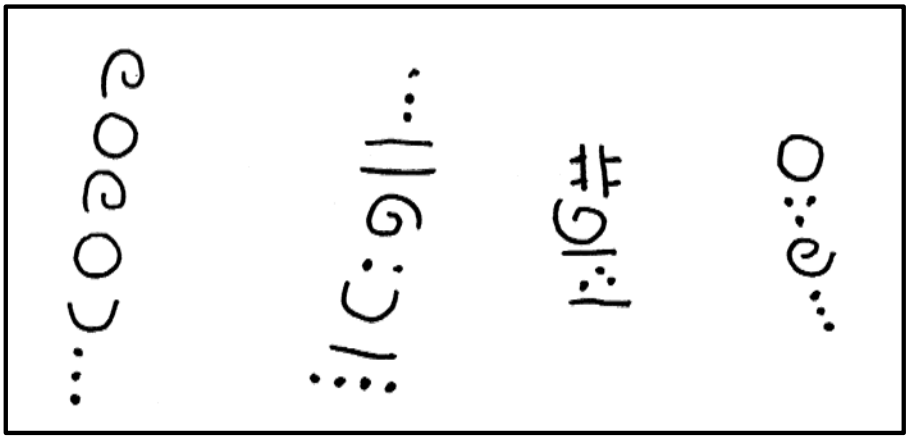


Fig. 66. Inscriptions from Aourdaoum 1

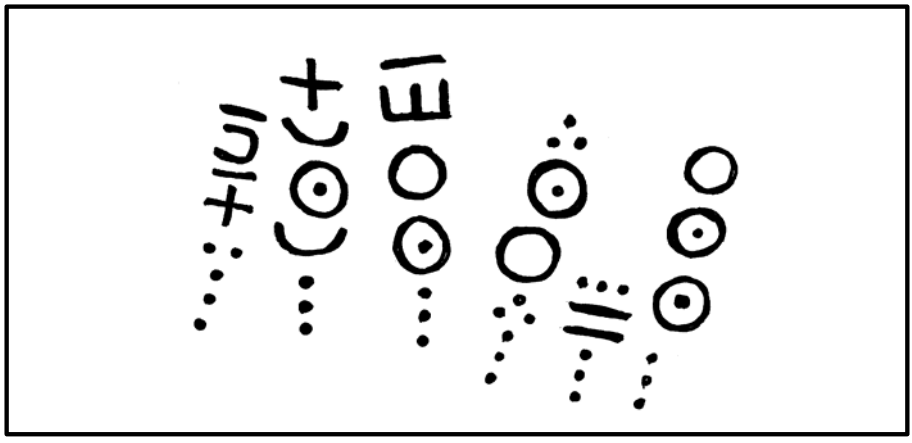


Fig. 67. Inscriptions from Aourdaoum 2

A second observation does not concern the form of a sign but its frequency. On the rock shelters near Aourdaoum in southern Algeria, Hansen photographed a complex of about 500 LB signs. Thus this site fulfils the minimal standards for a strong statistical analysis. The inscriptions provide a fairly normal Tifinagh alphabet and a statistical frequency of signs within the normal range of fluctuation, but with one great exception: the sign ⵖ which is normally one of the rarest (transcribed as γ, q or x) here has a frequency of 13 % and is the second most frequent

(Pichler: 2006). So far we do not know of any other location where this phenomenon has been observed. An overwhelming number of this sign (nearly 90 %) can be found at the beginning of lines, and it could therefore imply a very short initial sequence, but linguists have not found a plausible explanation to date.

Searching for the oldest inscriptions of the Sahara

It is quite usual among the rock art researchers to call every inscription of that region "Tifinagh" (or: tifinar). This is certainly correct for the overwhelming majority, but not for every single one.

In 1997 Muzzolini made a very interesting attempt of searching for the oldest Saharan rock inscriptions using indirect dating (unpublished, documented by private letters to the author). He was naturally aware of the enormous problems of comparing criteria like "style" or "patina", but he attempted to construct a relative chronology, and followed it with a very rough absolute chronology based only on rock art criteria. A second step involved an epigraphist checking that these chronologies were compatible with what can be deduced from the form of signs, the existence and absence of signs etc.
Muzzolini's general position was that more than 99 % of the Saharan inscriptions belong to the "Camel Period", with a very few (perhaps half a dozen) possibly belonging to the end of the "Horse Period". Since there is no undisputed absolute chronology for African rock art to date, there is of course no agreement among the researchers about the temporal limit of these periods. While Muzzolini dates the transition to c. 200 BC, other researchers like Lutz estimate it to about 200 years later. However, Muzzolini's goal was to search for inscriptions dating from the end of the Horse Period or from "Early Cameline". Due to his special knowledge he took only examples from the Tassili.
The result of his attempt was the extraction of about six panels, which could possibly contain the oldest LB inscriptions of the Sahara.

Tedar 1
This rock shelter in northern Tassili has been occupied by several groups from the Iheren-Tahilahi (Final Bovidian) until the present day, resulting in a confusing intermingling of compositions. All inscriptions of this location are painted and of very diverse appearance.

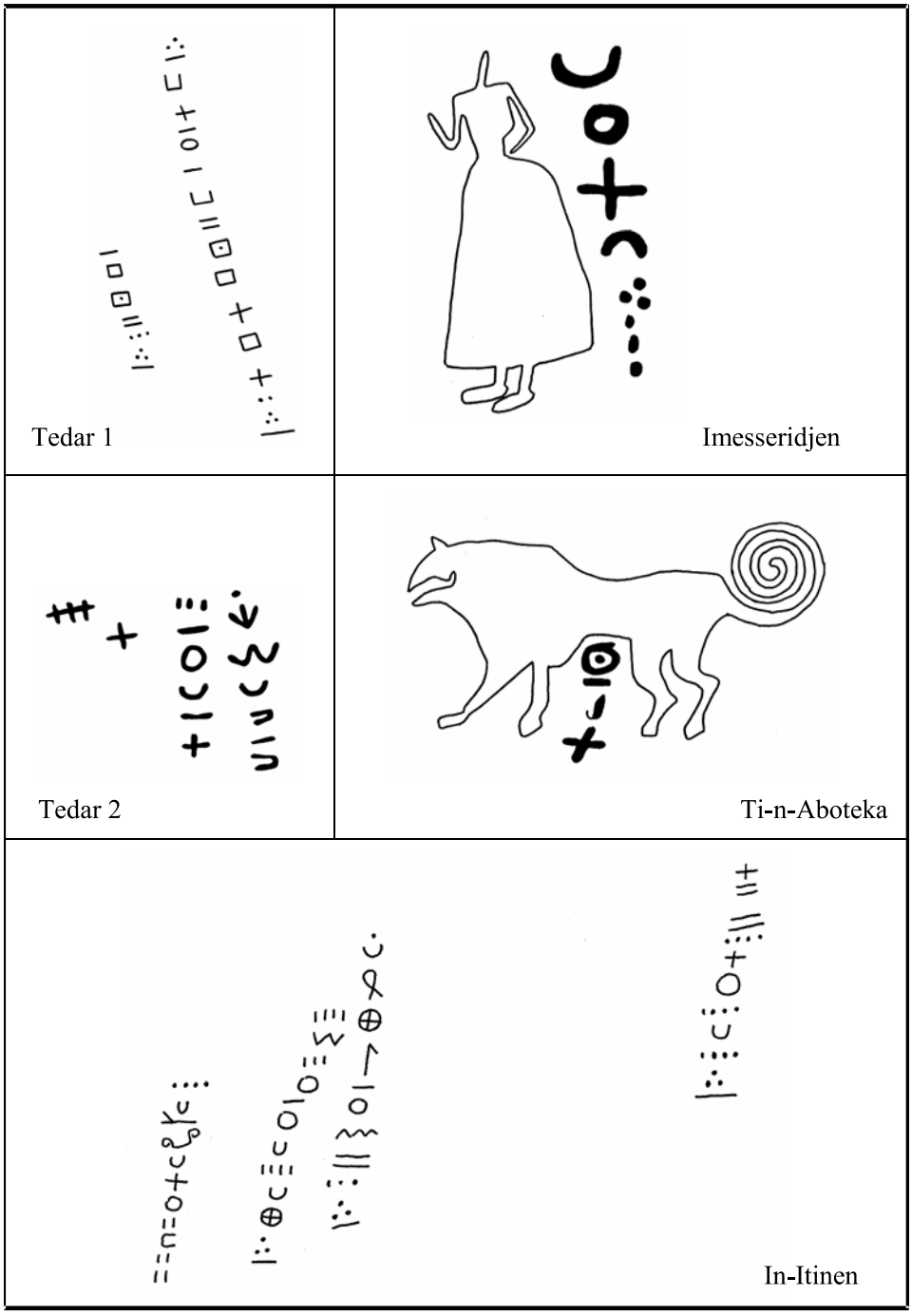


Fig. 68. Inscriptions from Tassili

Muzzolini distinguished four types. The most interesting for our purpose are the small ones in red and ochre.
Tedar 1 consists of two vertical lines with very small red characters. Muzzolini suspected them to be linked to a "Tin-Auneuin" herder to the left of them because of very similar patina. As this figure can be dated at least to the beginning of the Horse Period (Mori: Pastorale recente) this would be by far the oldest LB inscription.
Epigraphic comment: "Constant signs" are used almost exclusively and do not allow any assignment to a period. However, both lines start with the sequence NK, and therefore the dating to the beginning of the Horse Period is quite impossible. As no typical Tifinagh sign occur, the lines could belong to the transition script as well as to Tifinagh.

Tedar 2
This panel contains very small characters in vertical lines, which are in part badly visible. Muzzolini dated them to Early Cameline or even contemporary with the chariots nearby (Horse Period).
Epigraphic comment: there are three examples of ⋯ , but no typical Tifinagh sign, and ⩛ and ⫲ are not usual in Tifinagh. Therefore, this inscription is very probably older than Tifinagh!

Baidikore
Some vertical inscriptions in very pale red colour from this location were suggested by Muzzolini to belong to the Horse Period, but their condition is too bad to make any comment.

Immeseridjen
Muzzolini was very sure about the dating of this short inscription. The whole shelter is full of depictions from the "Epicaballine" stage – the transition between Horse Period and Camel Period. The signs have the same patina as the woman with the typical red cloak.
Epigraphic comment: ∴ is not usual for transition script, ⋮ is totally unknown in this period. Therefore, if the linking to the pastoral scene is correct this would be the oldest Tifinagh inscription so far!

In-Itinen
Muzzolini states the same description and date as to Immeseridjen: a typical "Epicaballine" scene and an inscription of the same patina.
Epigraphic comment: we can observe a typical transition from dot-signs over short lines to lines, but there is one typical Tifinagh sign also, ⵔ .

This inscription could thus be a typical example for the time “end of transition/very early Tifinagh”.

Ti-n-Aboteka

This is a short vertical inscription in ochre under the stomach of a felid in the Cameline style, both with the same colour and patina. Thus for Muzzolini the connection to Early Cameline is certain.

Epigraphic comment: all four signs are totally neutral, so no assignment is possible.

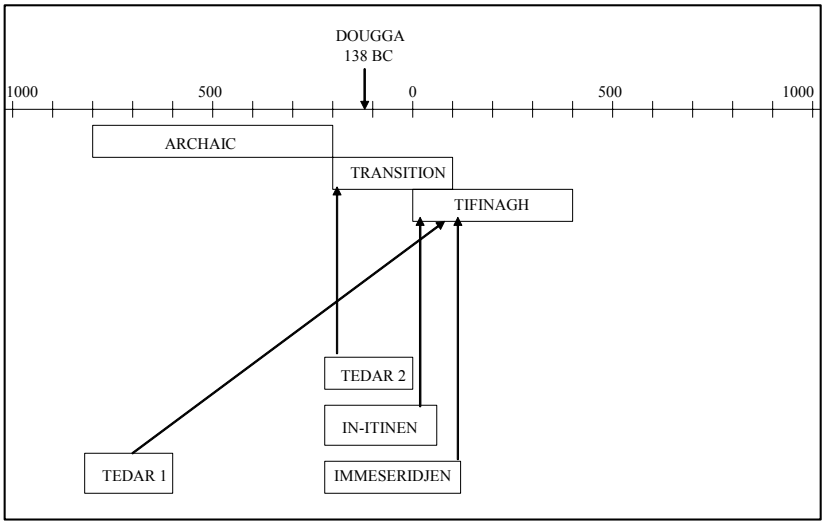


Fig. 69. Timetable of early rock inscriptions (Muzzolini)

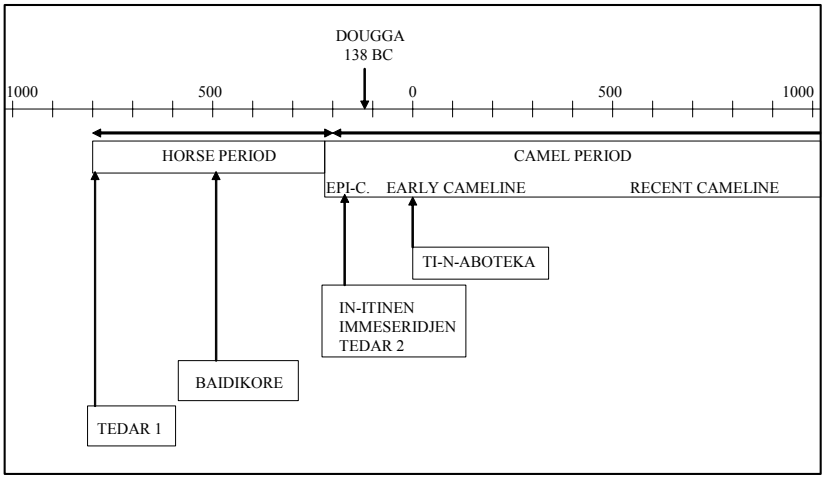


Fig. 70. Timetable of early rock inscriptions (Pichler)

Hachid (2000) began her own search for the oldest inscriptions. She believed she had found six to seven inscriptions from the Tassili and Tadrart with exclusively Caballine context ("période des chars"). Noticing an identical pigment and patina as the iconographic figures, she ventured to date them to 1300 – 1200 BC. Hachid established the theory that these inscriptions were the result of a creative act of invention without any external influence. As these presumed earliest inscriptions show a fully developed system of writing that has undergone no essential modification in subsequent centuries, it is obvious that it cannot have sprung from the inventors head without any precursor. Such an advanced stage of writing demands a long period of evolution. Going in search for the necessary precursors, Hachid resulted in having found them in the Proto-Berber art of the Capsien period (11,000 BC). It is suggested that a second step of development occurred in examples of body painting and tattoos from the Bovidian stage of Proto-Berber culture of the Central Sahara (7,000 BC). A third step is assumed to be represented by certain geometric engravings of the Sahara Atlas:

> *"Avec les temps protohistoriques et historiques, le dessin figurative tend à disparaître; le style géométrique envahit les parois et peu à peu cet art se confine aux graffiti. Au début de ce processus, entre la fin de la période des chars et le début de la période libyco-berbère, on ne sait d'où ni comment surgissent les premiers caractères d'écriture"* (Hachid 1992:147).

Chaker/Hachi (2000) agreed with the argument that there is a continuous tendency to schematise and geometrise, starting at the end of the Bovidian period. A series of alphabetical characters such as anthropomorphic, triangle, rhombus, stripe, parallel lines, crossing lines, and isolated lines developed in this way.

As a starting point of my critical comment of this argument I must first disagree with a few details. There is much evidence that the geometric engravings of the Sahara Atlas occur contemporaneously with the inscriptions (see Hachid 2000:165, Fig. 251), and therefore they cannot be precursors of the script.

Some of the signs listed by Chaker/Hachi have never been used as alphabetic characters (e.g. triangle, rhombus), the anthropomorphic figure, describes by them as *"le cas le plus frappant"* (2000:100) is not really a good example for the transition from geometric signs to the oldest alphabetical characters: it was not used until the Tifinagh period – with a gap of about 2000 years!

What is left? Not much more than simple lines, parallel lines, and crossing lines. This primitive inventory has been used all over the world

from the earliest manifestations of mankind. There are too many missing links that prevent us from establishing an evolution that spanned a period of about 10,000 years.
In addition, the creation of an elaborate alphabetical script without any previous stage of pictographic or syllabic script would presuppose one oft the most ingenious acts of invention in the history of mankind. We can find no other example in the world. The assumption that this brilliant creator took the same signs for the same phonemes in seven cases as the creators of the OP alphabet is beyond any credible probability. So it seems reasonable to restrict ourselves to the assumption that the LB script was not an own invention in the strict sense of the word, but a very creative adaptation.
There is one final brief comment to make on the examples of the supposed oldest inscriptions published by Hachid. Some of the painted inscriptions are hardly visible in the photographs (e.g. Fig. 263: Takoudematine), and a serious epigraphic comment is therefore not possible. Some others that are fairly visible (e.g. Fig. 258: Techekelaouat, Fig. 261: Titeghas n'Elias) show no typical Tifinagh sign but a series of dotted signs (from one dot up to four dots). So if these were very old inscriptions we had to throw overboard the common doctrine that dotted signs appear very late in the evolution of the LB script.
Conclusion: This comparison between an attempt at indirect dating by the patina and the context and epigraphic analysis shows on the one hand that it is extremely risky and can lead one totally astray (Tedar 1). On the other hand it reveals some useful clues as to the parallelism of the supposed rock art periods and the supposed stages of the evolution of the LB script. We were not able to find an inscription that belongs beyond any doubt to the Horse period. The results point to the assumption that the oldest Saharan inscriptions start in the transitional phase of the Horse and Camel period.

4.6 Neo-Tifinagh

This modern version of Tifinagh was put forward by the Académie Berbère in the 1960s. It is written from left to right, marking all vowels, the alphabetic order is modelled on Latin. Nowadays there is a substantial amount of variations for different languages like Kabyle, Tashelhit, Tamazight, Tarifit, Guanche-Tamazight etc. A comparative table of two examples can be seen at figure 72.

The critical comments on Neo-Tifinagh are widely spread. While the one classify these attempts as artificial, folkloristic kitsch, more suit-able for travel brochures and logos than daily use, others diagnose a strong nationalist background.

Drouin's comment: *"Un certain nombre d'intellectuels tendent de refondre certains alphabets existants en remplacent une partie de leurs caractères jugés peu pratiques et sujets à confusions. Les créations sont conformes à ce qui existe dans les différents écritures phonétiques: le signe est arbitraire, la valeur et la forme des lettres sont négatives et différentielles, leur efficacité reposant sur leur opposition réciproque dans un ensemble qui fait système"* (1994:575).

Since 2003 the discussion about the Amazigh-movement has entered a new stage: King Mohammed VI of Morocco signed a law that made a Neo-Tifinagh script the official writing system for Tamazight. It is used in school education based on programs developed by IRCAM (Royal Institute for Amazigh Culture). Of course this was not the final point of development. The very controversial discussion about the implications of this decision can be followed on numerous internet pages.

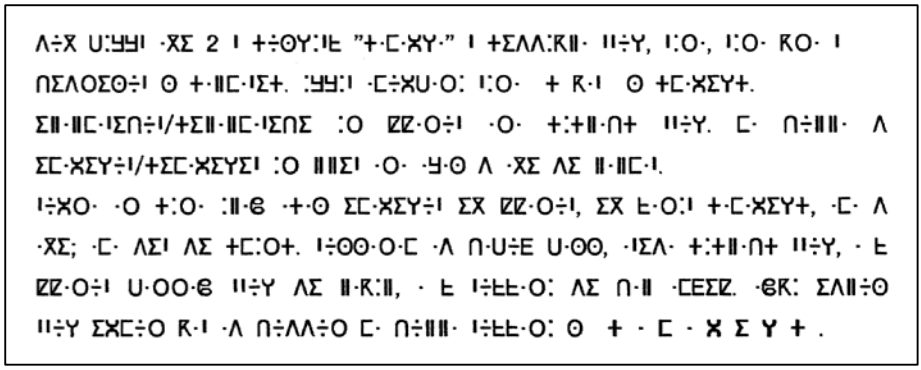


Fig. 71. Neo-Tifinagh text

NEO-TIFINAGH		
	Tamazgha	Afus D.W.
Tigherit	•	•
YEB	ⴱ	ⴱ
YEJ	ⵊ	ⵊ
YED	ⴷ	ⴷ
YAH	ⵀ	ⵀ
YAW	ⵡ	ⵡ
YEZ	ⵣ	ⵣ
YEZH	ⵥ	ⵥ
YEZZ	ⵙ	ⵙ
YAKH	ⵅ	ⵅ
YADD	ⴹ	ⴹ
ILY	ⵍ	ⵍ
YEK	ⴽ	ⴽ
YEL	ⵍ	ⵍ
YEM	ⵎ	ⵎ
YEN	ⵏ	ⵏ
YES	ⵙ	ⵙ
YESS		ⵚ
YEGH	ⵖ	ⵖ
YEF	ⴼ	ⴼ
YAQ	ⵇ	ⵇ
YEG	ⴳ	ⴳ
YER	ⵔ	ⵔ
YESH	ⵛ	ⵛ
YET	ⵜ	ⵜ
YETT	ⵟ	ⵟ
YU		ⵓ
YE		ⵄ
YI		ⵉ
YO		ⵓ
YAHH		ⵃ
YECH		ⵠ
YEP		ⵒ
YEV		ⵯ

Fig. 72. Neo-Tifinagh

5. The eastern border of the Libyco-Berber territory

Even if some scholars were sceptical for a long time it is nowadays common doctrine that the western border of the LB territory is marked by the Canary Islands.
The eastern border is incomparably more disputed. The current doctrine is that the Egyptian oasis of Siwa is the easternmost point of the LB province, at least concerning the LB language (Galand 2000:1).
During the last years researchers found some inscriptions which could shake this school of thought. Assignments of single lines to an alphabet are always risky, especially if the signs are extremely geometrical and universal like the LB ones. In this context Galand (2000:1) is right to refer to the excesses of such assignments by the American "Epigraphic society" in propagating the existence of LB inscriptions in America.

In 1995 Bülow-Jakobsen et al. published rock inscriptions from Al-Muwayh: two vertical and eight horizontal lines next to a depiction of a man with a stick. They identified Cursive-Hieratic, Hieroglyphic, Arabic and Greek characters among them. But the most discussed line is the fourth horizontal one from above (Figure 73/1).
Robin and Lemaire classified this line as "Thamudic", but the five signs could be LB as well (TMDZB). Galand (2000:1) expresses his reservation by pointing out that the signs four and five look too modern as for being integrated in an ensemble dated to the first centuries BC.

In 2000 Lemaire and Negro published a horizontal line from the oasis of Bahariah which was classified by Lemaire as "North Arabic or Libyan" (Figure 73/2). Nearby Negro found a second inscription which has not been published so far (Figure 73/3).

In 2001/02 Negro drew attention to an enigmatic inscription on the original entrance of the Great Pyramid of Gizeh, classified it as LB and dated it to c. 1240 BC (Figure 73/4).

Last but not least two examples for possible inscriptions far away from the traditional LB domain:
During an archaeological stage for saving the monuments of the Nile valley Spanish researchers found in 1965 a small rock shelf with four vertical lines in a rectangular frame. This inscription from Khor Kilobersa (6 km south of Derr) consists of nine different signs of which

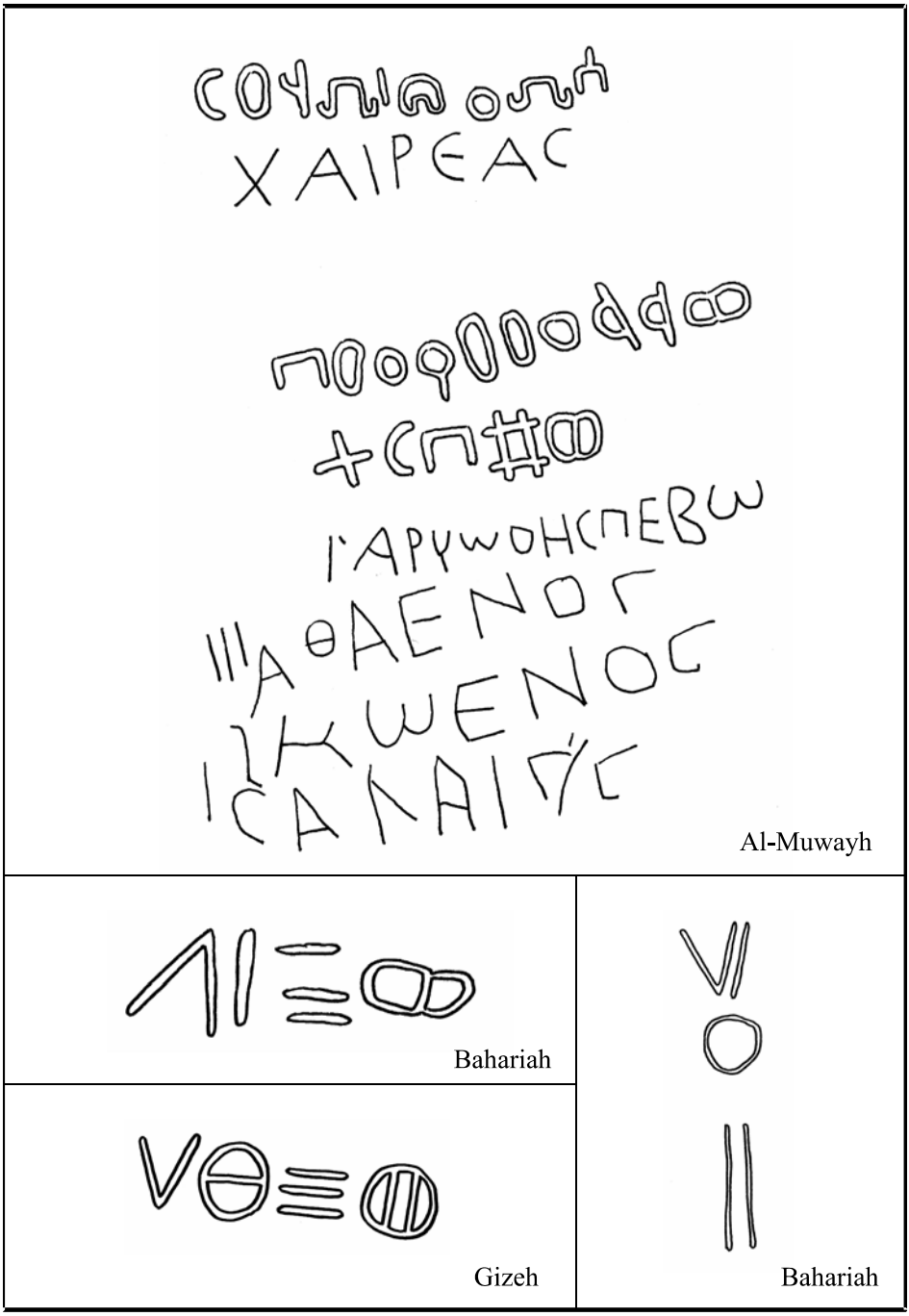


Fig. 73. Inscriptions from Egypt

only four to five can be found in relevant alphabets (North-Arabic, South-Arabic, Old Ethiopic). Especially signs consisting of two or three parallel lines are unknown in all of these alphabets. But all of the nine signs are well known in the LB alphabet. Even if it is not sure from which direction one should look at the rock shelf and some signs can be interpreted in a different way, Almagro (1969) did not hesitate to conclude in this assignment.

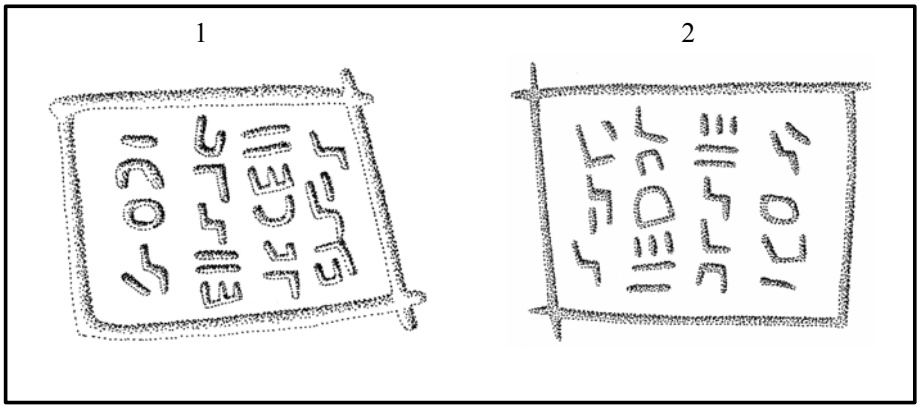


Fig. 74. Inscription from Khor Kilobersa – versions Almagro (1) and Pichler (2)

Cailliaud (1826) was the first to record Greek, Coptic and Arabic inscriptions on stone buildings at the oasis of Selima, situated in northern Sudan. Newbold (1928) noted *"a few examples of Tifinagh-writing"* too. However, Negro seems to be the first researcher who consistently photographed the thousands of signs not only on the stone walls but also on surrounding rock panels. Among series of chaotic looking arrangements of signs, one can find some groups which look like intended vertical or horizontal lines of script, but could easily be accidental groupings of tribal marks, owners marks, camel brands etc. We (Negro; Pichler: 2005) analysed 16 arrangements (examples see Figure 75) including 93 signs and compared them with statistical data of traditional LB script. The result was quite astonishing: what we found was not only a nearly complete alphabet but also a statistical frequency of signs which fits into the traditional amount in an extraordinary way. Of course this is no final proof but a very strong indication of the presence of LB script. An arbitrary collected amount of tribal marks or camel brands would never reach this high level of probability.

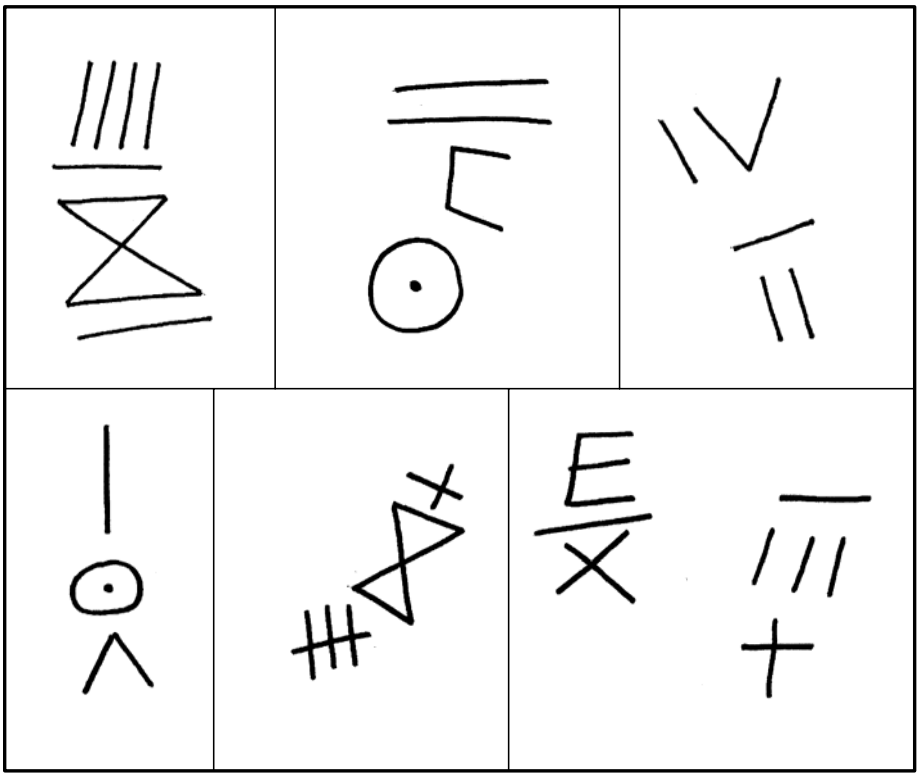


Fig. 75. Inscriptions from Selima

6. The Libyco-Berber script in contact with the Latin script

During a period of several centuries Libyan people came into close contact with the Roman culture and thus with the Latin script. I was able to prove on Fuerteventura that on this island Libyan settlers had control not only over their own traditional script but also over the script of the Roman colonisators. It is quite instructive to notice influences of the LB script in Latin lines.

At the location "Cuchillete de Buenavista" I documented two very similar lines presenting the same personal name IVFAS: four signs in typical Capital-Cursive writing, the last one probably a LB letter for a sibilant (Figure 76/1). This surely was no mistake in writing. While the Latin alphabet provides only one sign for sibilants (S), Libyan people were accustomed to use several signs for different sibilants (at least 3–4). So the two lines from Fuerteventura look as if the Libyan writer had used a LB sign for a phoneme which could not be covered by a Latin character.

At the location "Montes de Valle Corto" we can recognize a second influence of LB writing. The horizontal line ASCA (probably a personal name) is repeated in a vertical line – writing one letter beneath the other as in LB lines (Figure 76/2).

The co-existence of these two features of writing can be visited at the site "Femes I" on Lanzarote: the personal name FELIS or FELIZ (= FELIX) in a vertical line and with the final LB letter (Figure 76/3).

Comparable observations can be made among the group of Tripolitanian inscriptions which initially were called Latino-Libyan (Goodchild 1950) and nowadays Latino-Punic (Levi della Vida 1963): a detail of the inscription IRT 889 from the Sofeggin-Basin shows a Latin word with a final LB letter (Figure 76/4).

A very special subject are the so called "Graffiti en Libyque de Bu Njem": a group of nine graffiti, found in 1968 on the walls of the fortress of Bu Njem/Libya (Figure 76/5). One of them can be dated by archaeological reasons to approximately 260 AD. Rebuffat (1974/75:183) called the script a variant of the Libyc alphabet.

In fact the lines present a very strange mixture of:

1. definitely Latin letters: A
2. signs that could be Latin and LB as well: W
3. definitely LB signs: ⵃⵃ
4. enigmatic signs: ⵯ

Comparable "enigmatic" inscriptions were found at Tmed el Koumas, Maknusa, Zinchecra, Er Roui and Wadi Tarut. A final allocation of these lines is not possible because most of them were documented under

"adventurous" circumstances. One example: the inscriptions of Er Roui were drawn by De Burthe d'Annelet freehand while standing on the saddle of a camel.

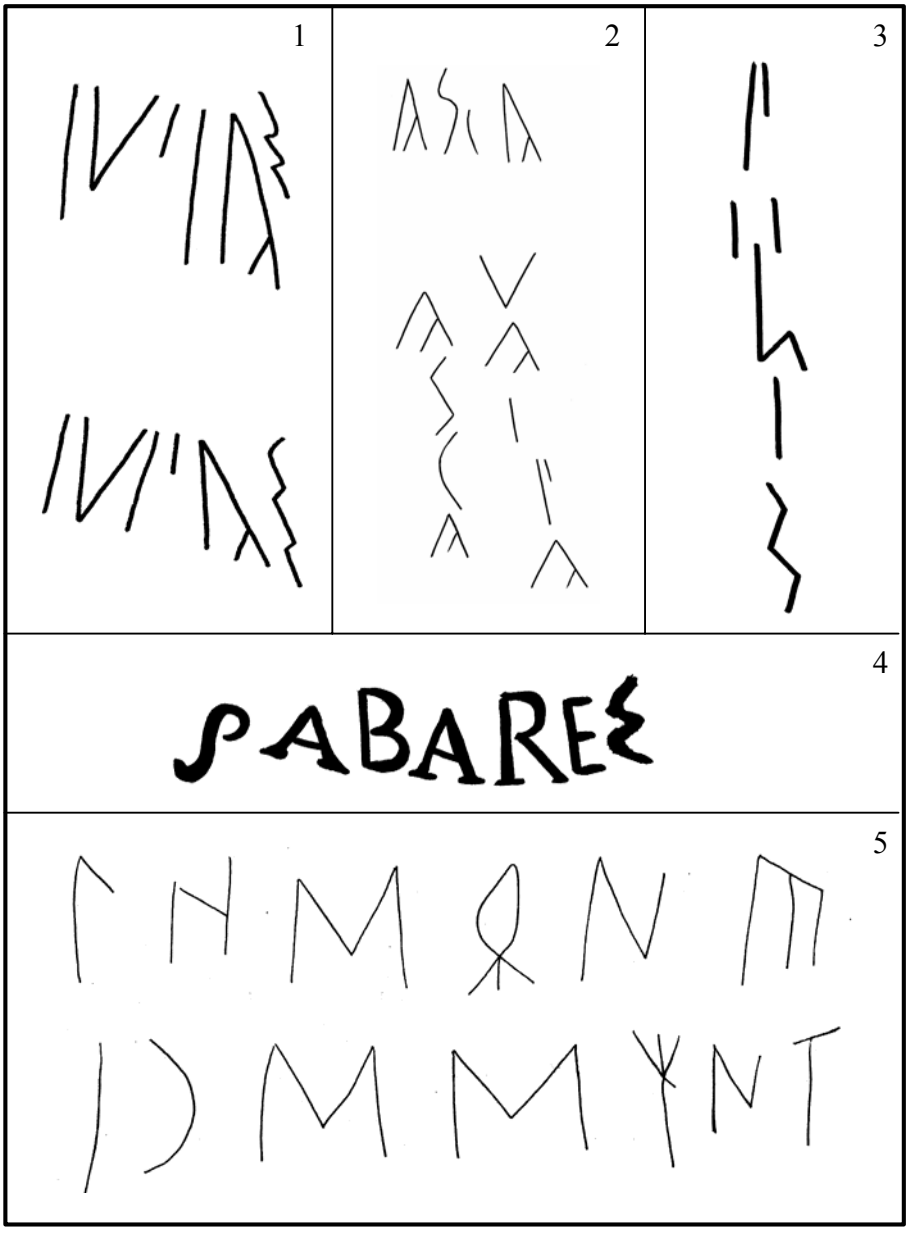


Fig. 76. Inscriptions from Fuerteventura (1, 2), Lanzarote (3), Tripolitania (4) and Bu Njem (5)

7. About "context", "association", "relation" and "composition"

During the last years a discussion arose about the iconographic "context" of rock inscriptions and resulting possibilities of indirect dating.
For Galand the great majority of inscriptions seem to be independent from the "dessins": *"la grande majorité des inscriptions rupestres paraissant indépendantes des dessins voisins"* (2001:2) Only a minority of the thousands of rock inscriptions is accompanied by additional drawings on the same panel and an association between them can be seldom proved. Aghali-Zakara published a very exact amount of 24,4 % of 45 "dessins" (2003:3), but didn't explain the basic material of this statistic analysis. For him the study of the graphic messages proves that there is no connection with the anthropomorphic or zoomorphic representations: it can be observed that the iconic representations and the inscriptions are apparently not synchronic and that the contents of the messages concern different subject than the neighbouring engravings. Unfortunately these strict assertions are not explained by example.
Aghali-Zakara is of the opinion that iconic representations do not need a comment and reports that for Twareg nomads the association would be a tautology. Hachid (2004:21) is right in commenting that we are not allowed to assume the same mental conceptions for nowadays Twareg and Paleo-Berber people. Additionally, must the inscriptions necessarily be a "comment"? How does Aghali-Zakara explain the fact of the coexistence of inscriptions and iconic representations on series of steles and grave stones?
What can we expect as meaningful messages on rock art panels? We cannot expect messages like "this is the image of a horse/ warrior/weapon etc." – this indeed would be a tautology. We cannot expect messages like "this is a magic scene of hunting" too – we can assume that the meaning of the depiction was evident for the creator, so a verbal interpretation was not necessary at all. What we can expect indeed is a message like "this was depicted by X".
But most of these considerations are pure speculation. As it is not sure if we ever will be able to "read" the messages of figurative depictions and we still are not able to read a great part of the inscriptions it is not easy to discuss possible semantic associations between figures and inscriptions.
What we should strive for above all is the usage of a most accurate terminology. What do we mean with "association": the spatial proximity of motifs or scenes or a semantic connection? Is "association" the same as combination, ensemble, episode, scene?

First of all it is recommendable to restrict oneself to the syntactic level of analysis. The relevant unit of examination is a rock art *panel*:

> *"a group of rock art motifs occurring in very close proximity on a rock surface of reasonably uniform orientation"* (Bednarik 2000:152)

If there are not only inscriptions on such a rock panel but also additional representations – iconic or abstract ones – we should speak about the *context*. So far we can clarify in a totally objective way if a rock inscription has a context or not. In the light of this definition the statement of Aghali-Zakara (24.4 %) cannot be accepted for the totality of LB inscriptions: Foum Chenna shows an amount of 38 % of inscriptions with a context of (iconic) representations, the rest of the Moroccan inscriptions only 24 % of iconic representations but 80 % if we take linear and geometric representations into consideration, too.

Hachid (2004:22) stresses the necessity of differentiation: she refers to the observation that most of the inscriptions from Ahaggar/ Tassili/Tadrart without context are recent ones (legible for nowadays Twareg people) while the not legible ones have a context which can be attributed to the "période caballine ancienne". Unfortunately this assumption is not supported by a quantitative analysis.

The next and more complicated question is that of the *relation* between the different elements of a panel: that means, in our case, the relation between inscriptions and iconic or abstract representations. This refers to the question of a possible identical or different age, style and technique. Without using means of direct dating we can only get closer to an answer by analysing the visual aspects of the different representations: the technique of pecking or scratching, the "style" of depicting, the patina etc. If these standards for a close relation are fulfilled, we can call parts of a rock panel a *composition*:

> *"an arrangement ... as to form a meaningful juxtaposed whole"* (Bednarik 2000:149)

Aghali-Zakara and others criticize that the only argument for supposed "associations" is the identity of patina and technique. Even if this argument must be used with great caution it should not be refused as absolutely useless.

If a rock art panel like that from Wadi Tekniwen/Messak (Fig. 90) shows – among other depictions – a giraffe with dark patina, a camel and a LB inscription with the same light patina, this is a good indication that the inscription is very *probably not* of the same age as the giraffe but *probably* of the same age as the camel. We cannot accept the

similarity/identity of the patina as a proof for a similar/identical age but as a very useful indication.
If we write about the site Azib n'Ikkis that "the anthropomorphic depiction and the inscription are of the same technique and patina" this is of course no proof that both representations were created by the same human being at the same day. It is no proof that both representations together build an intentional "composition" with a semantic association. However, this analysis of visual criteria leads to the assumption that both elements *can* originate from the same period.
In case of the panel from Azib n'Ikkis we can move one step further: the syntactic analysis of the spatial arrangement of the anthropomorphic representation and the inscription looks as if both elements were really parts of a composition.
In contrary, the same cannot be said about the panel Oukaimeden 2. It does not look at all like an intentional composition. Nevertheless patina and technique indicate a similar age of both elements, but they are created probably from another hand.
In some cases visual criteria lead to useful indications for the establishment of a relative chronology what can be shown on the comparison of two Moroccan sites.
Foum Chenna: analysing the context of the inscriptions there can be no doubt that the representations of horses, camels, warriors etc. are contemporary with the lines of script (Figure 84).
Ouaremdaz: rock art and inscriptions can be found on Precambrian gabbro of originally pale green colour which changed by oxidation into a dark blackish colour. Substantial differences in patina clearly evidence three groups of peckings (Figure 91/92):

1. Arabic inscriptions, recent dates, footprints etc. in a very light patina.
2. Circles, half-circles and horsemen in a linear style (comparable with those at Foum Chenna) in a light brown patina.
3. The LB inscriptions as well as a series of geometric motifs (circles, serpentines etc.) show a very dark patina – comparable with the surrounding surface of the rock panels.

Thus the site of Ouaremdaz provides a very clear indication that its script lines do not belong to the period of the so-called "Libyco-Berber" depictions but to a considerably older period.
Résumé: besides some useful indications for a relative chronology the interpretation of visual criteria only leads to possibilities and probabilities – nothing more! It's up to other specialists (prehistorians, epigraphers, linguists etc.) to discuss these first assumptions.

Concerning the search of the oldest inscriptions there is an evident contradiction between the judgement of rock art specialists/prehistorians and epigraphers. Some of the first ones believe in being able to locate the oldest inscriptions in the Central Sahara:
Muzzolini: Tedar/Tassili – beginning of the Horse period (700 BC).
Hachid: Tachekelaouat/Tassili – "période des chars" (1300/1200 BC).
Their dating is based only on comparison of colour and patina with the iconic context.
From the epigraphers' point of view this dating cannot be confirmed. All these inscriptions in question contain elements which are considered to belong to much younger periods: dotted signs, sequences like (AWA) NEK etc.
There are only two possibilities of solution:
1. The indirect dating leads to wrong results. The supposed oldest inscriptions of the Sahara are much younger.
2. The indirect dating leads to correct results. In this case the epigraphers had to revise some of their fundamental statements about the development of the LB script: above all the thesis that dotted signs and sequences like (AWA) NEK are typical only for the youngest periods of LB writing. The consequence of this alteration of the common doctrine would be that the basic thesis of this book was totally wrong. Instead of a development from Morocco we had to accept an introduction of the script from the Northeast, possibly by the Garamantes. This is of course not inconceivable. What is hardly imaginable is the consequence that dotted signs were totally usual at the beginning of the LB script (1300 BC), then unknown for a period of more than 1000 years and finally revived in the youngest period of Tifinagh script.
As all of the inscriptions in question are painted ones it would be quite easy to clear up the contradiction by methods of direct dating. Due to the complexity of the whole subject, an international and interdisciplinary approach would be necessary to solve the problem of the temporal linking between rock art and LB inscriptions.

8. Conclusion

General evolution:

- The oldest LB inscriptions can be found in Morocco.
- The alphabet was brought to the Strait of Gibraltar by the Phoenicians.
- The indigenous people south of the Strait of Gibraltar (the tribal federation of the Mauri?) adopted this OP alphabet to the conditions of their language.
- The LB script was constructed in consideration of principles of the economy and aesthetics of writing.
- The archaic version of the LB script spread to the east till the Kabylia and to the west till El Hierro.
- During the time of the Roman Empire the classic version of the LB script developed to the "official" script for monuments and grave stones from Morocco till Libya. These inscriptions often are connected with Punic or Latin lines. This version reached the eastern islands of the Canary archipelago.
- While the LB script was handed down over many centuries with slight alterations sometime a great change happened to a totally new alphabet. This change was preceded by a phase of transition in many regions of North Africa and the Sahara.
- The new script called Tifinagh has been used by Twareg people up to the present in thousands of rock inscriptions.
- Nowadays we can recognize a tendency to revive the script for modern usage in the version of Neo-Tifinagh.

Temporal development:
Despite many new discoveries it is still not possible to draw up an exact time table of the different stages of development.

- It is a legitimate question if there is really a succession of four periods at all. Wasn't it rather a sequence of three periods (archaic – transition – Tifinagh) with liquid transitions and one "parallel-development" of an "official" script during the time of the Roman Empire (third century BC – fourth century AD)? There is much to be said for this assumption, above all the fact that both types (ancient and classic) are nearly identical, only the socio-cultural background is totally different.
- We have found serious indications for the starting time of the LB evolution: ninth – seventh century BC.

- If the inscriptions of Foum Chenna are contemporary with the iconic representations – for the moment I have no doubt about it – this could be a very useful indication of the age of the process of transition. They are embedded in a milieu which is dominated by horses as well as by camels. So a very cautious dating for the site Foum Chenna could be: 200 BC – 0. That perfectly corresponds with the results from other regions like Immidir, Ahaggar etc. and with the résumé of the search for the oldest inscriptions of the Sahara.
- We have no clear indication so far about the time when the transition process to the Tifinagh script was finished. It is totally impossible that the inscription Tedar 1 originates from the Early Horse period, we probably can assume that there exists no Tifinagh inscription from the centuries BC.

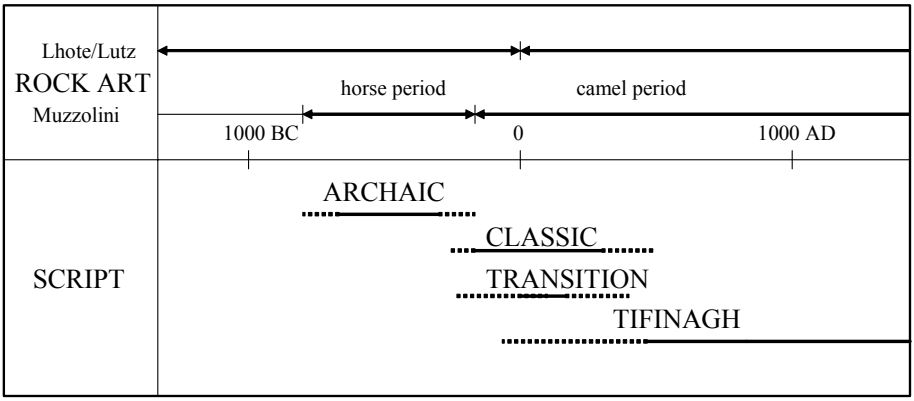


Fig. 77. Time table

Regional distribution:

- Most probably the evolution of the LB script started in the mountains and valleys of the High Atlas including the Pre-Saharan area south of it. A wave of emigration brought the script to the Canary Islands in contrast to the old-dated thesis that it was not possible to surmount this distance by sailing at that time. A second way of distribution reached the mountains of the Kabylia.
- The classic type of LB inscriptions covers the northernmost periphery of the Berber territory, thus identical with the areas of Roman occupation. We have not had any allusion so far if the usage of this "official" script started at one point, respectively where this point could have been. A second wave of emigration

brought this script at least to the eastern islands of the Canary archipelago.

- The transitional script can be found in several widely scattered regions: from the Western Sahara and southern Morocco to the Sahara Atlas, from southern Algeria to the Adrar and Air, as well as from Messak to Tripolitania. A search for possible directions of development would require a special analysis of details.
- The distribution of the Tifinagh script is identical with the Twareg territory: reaching from Northern Mali and Niger across Algeria to Western Libya.

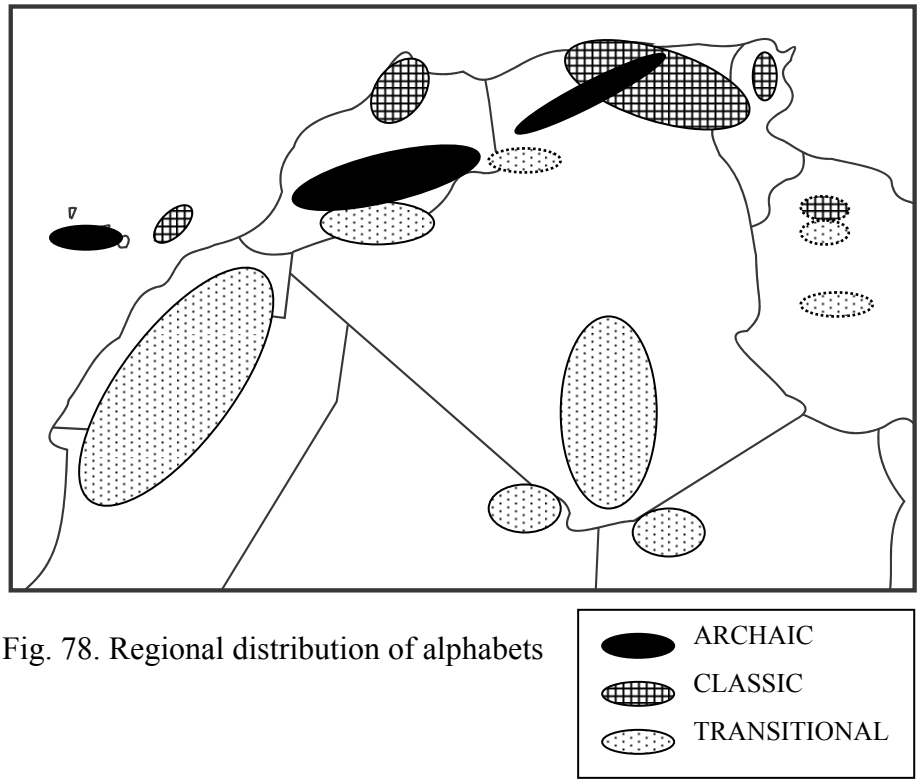


Fig. 78. Regional distribution of alphabets

The type of script:

- The LB script is a consonantal script with three half vowels.
- One part of the LB alphabet can be derived from characters of the OP alphabet. A series of these signs have kept a memory of their iconic ancestors (pictograms from Near East).
- Another part of the LB alphabet consists of very simple elementary signs. They were chosen intentionally from a sample

of hundreds of possibilities to make complete a thought-out system of writing.

- Therefore, it does not correspond with the reality if some scholars declare the LB script as a totally independent invention.
- Nevertheless the origin of the LB script is anything but a passive taking over of a foreign script. It is a creative act of establishing a new concept of script resulting in one of the most perfect systems in regard to principles of the economy and aesthetics of writing worldwide. Seen from this point of view today's Berber people really can be proud of the achievement of their ancestors.

Fig. 79/80. Examples of archaic inscriptions

Fig. 79. Oukaimeden/Morocco

Fig. 80. El Julan/El Hierro

Fig. 81-83. Examples of classic inscriptions

Fig. 81. Montaña Blanca/ Fuerteventura

Fig. 82. Juan del Hierro/Lanzarote

Fig. 83. Tenezar/Lanzarote

Fig. 84/85. Examples of inscriptions in a transitional alphabet

Fig. 84. Foum Chenna/Morocco

Fig. 85. Oued I-n-Ana/Algeria

Fig. 86/87. Examples of inscriptions in a Tifinagh alphabet

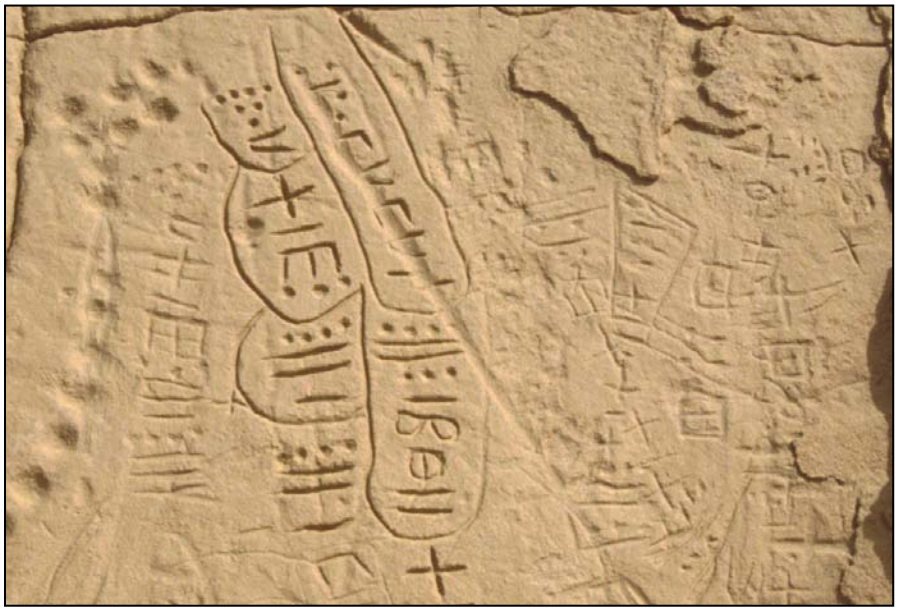


Fig. 86. Tisroukam/Algeria

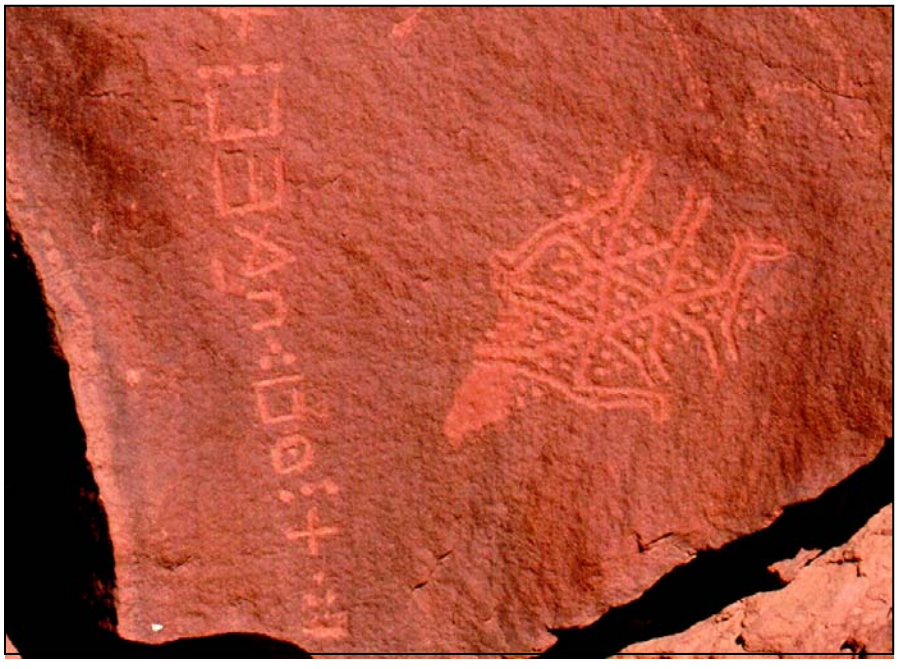


Fig. 87. Mathendush/Libya

Fig. 88/89. Supposed old inscriptions from Tassili

Fig. 88. Ikadnouchere/Tassili

Fig. 89. In-Itinen/Tassili

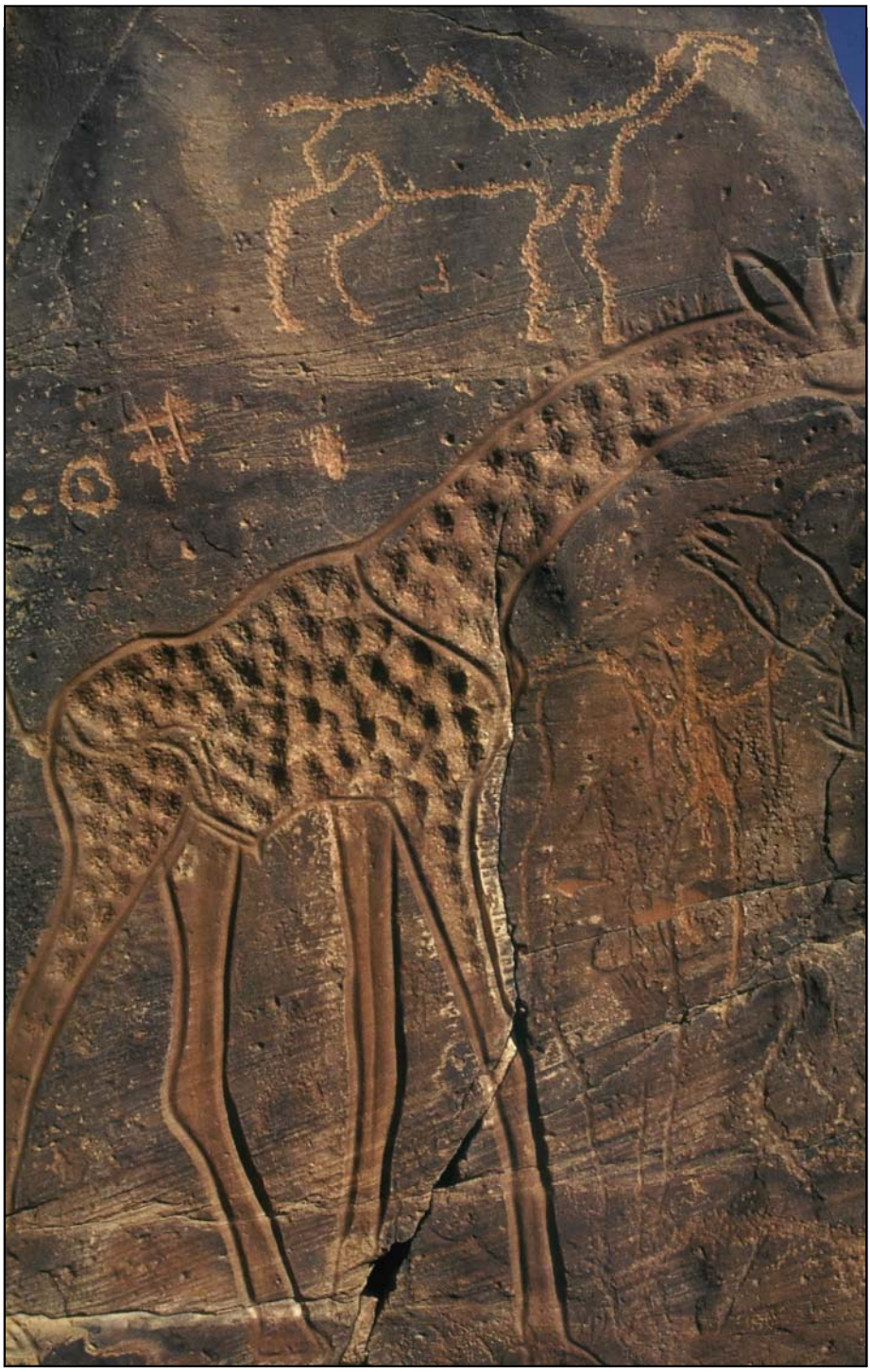


Fig. 90. Wadi Tekniwen/Libya

Fig. 91/92. Examples of different patina from Ouaremdaz

Fig. 93. Example of hardly visible inscriptions (Foum Chenna)

Fig. 94. Example of panels with many dots (Ait Ouazik)

Appendix 1: Commentary to the drawings

Of course, it was not possible to visit each site personally. Therefore, I had to use old drawings in some cases which must be interpreted with great reservation. Being fully aware that every drawing of a rock inscription is the result of individual perception and thus a sort of interpretation I only took drawings as basic material for the analysis because an epigrapher is forced to see a sign not as an abstract figure but as a part of an alphabet (= a character). If possible the drawings are based on original photographs. If possible today's techniques of digital image processing were used to clear up details. As a result of this computer analysis my point of view differs in some cases from previous publications, even from own ones. I did not reproduce a scale because this is no documentation of rock art panels and the size of the signs is secondary. The different techniques of realizing the inscriptions (painting, pecking, engraving, scratching) are shown by different ways of drawing.

The main problems of documentation and analysis:

- Some inscriptions cannot be studied anymore because of destruction. Old drawings can be taken in account only with great reservation. In some cases a reconstruction is possible from old photographs (e.g. Azib n'Ikkis 1).
- Some inscriptions are terribly destroyed by recent engravings (e.g. Ouaremdaz – Fig. 91).
- Some inscriptions on panels with small inclination have almost disappeared by means of natural erosion (e.g. Foum Chenna – Fig. 93).
- Some painted inscriptions are very pale and thus hardly visible (e.g. Tachekelaouat).
- On some panels there are a lot of dots and it is not at all sure in every case which of them belong to the inscription and which not (e.g. Ait Ouazik – Fig. 94). A special detail of this problem concerns the differentiation between ○ and ⊙.
- In some cases the signs are not arranged in distinct lines, so that the order and sequence of the signs is not at all clear (e.g. Taouz).

All drawings except Fig. 2/34/40/56-1/56-2/57-1/57-2/63/76-4 originate from the author.

Appendix 2: Documentation of the sources used for the drawings:

Fig.	source
2	1: Malhomme; Galand 1960:412-415
	2: Rodrigue 1999:326
24	Malhomme; Galand 1960:412-415
25	Rodrigue 1999:327
26	Rodrigue 1987
27	Pichler; Rodrigue 2000:202
28	Pichler 1999b:146
29	Rodrigue; Pichler 2002:14
30	Pichler; Rodrigue 2001:23
31	Poyto;Musso 1969:11, 30, 79, 86
32	Pichler (unpub.)
34	1-3: Pichler 1996:23, 24, 28
	4-7: Ulbrich 1996:334, 337, 339
35	Chabot 1940:69, 101, 113, 193
	Galand 1966:40, 66, 70
40	Galand 1989b:76
41	Ghaki 1986:320
42	Chabot 1940:6
44	1-5: Pichler 2004:43
	6: Pichler (unpub.)
45	Brogan;Smith 1984:1A, 2A, 2B, 3A, 11, 39, 40
47	Malhomme; Galand 1960:412
49	Pichler 2000a:177
53	Pellicer Catalán 1974:Fig. 44, Fig. 38
	Galand 1977:77
54	Monod 1938:99-103
56	1: Dupuy 1991:276/Fig. 12
	2: Dupuy 1991:283/Fig. 4
	3: Mauny 1954:16/Fig. 11
	4: Dupuy 1991:283/Fig. 8
	5: Dupuy in Aghali 2004:3
	6: Mauny 1954:16/Fig. 13
57	1-2: Soleilhavoup 1988:59
	3: Soleilhavoup 1990:77
	4: Trost 1981:170
58	1-6: Hansen (unpub.)
	7-8: Gauthier 2003:Fig. 5/Fig. 4
59	1-3: Muzzolini (unpub.)

4: Striedter 1984: Abb. 189

60 1: Le Quellec 1987:221/225
2: Le Quellec 1987:344
3: Gauthier (unpub.)

61 1-2: Flamand 1921:69, Fig. 16, PL. XLIX
3: Amara (unpub.)

63 Soleilhavoup (unpub.)

64 Galand 1999a:166

66/67 Hansen (unpub.)

68 Muzzolini (unpub.)

71 Tamazγa H.2/1994

73 1: Negro (unpub.)
2: Lemaire; Negro 2000:172
3: Negro 2001/02:150
4: Negro (unpub.)

74 1:Almagro 1969:368
2:Pichler (unpub.)

75 Negro; Pichler 2005:177, Fig. 8

76 1: Pichler 1993:405, 413
2: Pichler 1995:31
3: Ulbrich 2004:37
4: Reynolds; Ward Perkins 1952:219
5: Rebuffat 1974-75:168

Photographs:

79 Rodrigue (unpub.)

80-84 Pichler (unpub.)

85 Gauthier 2003:38/Fig. 5

86 Hansen (unpub.)

87 Ruprechtsberger (unpub.)

88/89 Muzzolini (unpub.)

90 Gauthier 1996:57

91-94 Pichler (unpub.)

References

Aghali-Zakara, M.

1997 Alphabets Libyco-berbères et informatique. *Lettre du RILB*, No. 3, 2-3.

1998 Du recueil empirique au traitement informatique des inscriptions libyco-berbères: La base de données. *Lettre du RILB*, No. 4, 2.

1999a De la stéle à la page. *Cahiers Pédagogiques des expositions l'aventure des Ecritures* 3 – La Page, 62-63.

1999b Les marqueurs d'orientation dans la lecture des inscriptions. *Lettre du RILB*, No. 5, 2-3.

2000 Séquences graphiques et lecture déductive. *Lettre du RILB*, No. 6, 2-3.

2001a A propos des signes libyco-berbères énigmatiques Sahariens, Sahéliens et Canariens. *Cahiers de l'AARS*. No. 6, 11-14.

2001b Unité et diversité des Libyco-Berbères. *Lettre du RILB* No. 7, 4-6.

2002 Unité et diversité des Libyco-Berbères (2). *Lettre du RILB* No. 8, 3-4.

2003 Messages graphiques et gravures rupestres. *Lettre du RILB*. No. 9, 3-4.

2004a A propos de variantes graphiques. *Lettre du RILB* No. 10, 2-3.

2004b De l'origine et de la survivance des écritures libyco-berbères. *Débuts de l'écriture au Maghreb*. Fondation du Roi Abdul-Aziz, Casablanca, 85-90.

2005 Retour sur l'association des gravures et inscriptions rupestres. *Lettre de l'AARS*, No. 28, 6-7.

Aghali-Zakara, M.; Drouin, J.

1988 Tifinagh-Forschungen. *Sahara Studien*. Hallein.

1997a Le sens differé – du lisible à l'énigmatique en tifinagh. *L'aventure des écritures. Naissances*. Bibliothèque nationale de France (exposition), 196-199.

1997b Ecritures libyco-berbères. Vingt-cinq siècles d'histoire. *L'aventure des écritures. Naissances*. Bibliothèque nationale de France (exposition), 99-111.

Almagro, M.

1969 Inscripcion Libica hallada en Khor Kilobersa (Nubia Egipcia). *Trabajos de Prehistoria* XXVI, 367-371.

Arnaiz Villena, A.; Alonso García, J.

2000 Egipcios, Bereberes, Guanches y Vascos. Madrid.

Basset, A.
1959 Ecritures libyque et touarègue. *Articles de dialectologie berbère*. Collection linguistique publiée par la société de linguistique de Paris LVIII, 167-175.
Bates, O.
1970 The Eastern Libyans. London.
Bednarik, R.G.
2000 Rock Art Glossary. *RAR* Vol. 17, No. 2.
Blau, O.
1851 Ueber das numidische Alphabet. *Zeitschrift der Deutschen Morgenländischen Gesellschaft*. Vol. 5. Leipzig, 330-364.
Brogan O.
1975 Inscriptions in the Libyan alphabet from Tripolitania, and some notes on the tribes of the region. In: Bynon J. and Th. (ed.): *Hamito-Semitica 1975*, 267-289.
Brogan O.; Smith D.
1984 Ghirza. A Libyan settlement in the Roman Period. Department of Antiquities. Tripoli.
Bülow-Jakobsen, A.; Fournet, J.-L.; Gabolde, M.; Robin, Chr.
1995 Les inscriptions d'Al-Muwayh. *Bull. de l'Institut français d'archéologie orientale*. Le Caire 95, 103-124.
Cailliaud, F.
1826 Voyage à Méroé, au Fleuve Blanc, au-delà de Fazoql, dans le midi du royaume de Sennar, à Syouah et dans cinq autres oasis; fait dans les années 1819, 1820, 1821 et 1822. 5 Vols. Paris.
Camps, G.
1978 Recherches sur la plus anciennes inscriptions libyques de l'Afrique du Nord et du Sahara. *Bulletin archéologique du Comité des travaux historiques et scientifiques*, new series, No. 10-11b, 143-166.
Chabot, J.-B.
1940 Recueil des inscriptions Libyques. Paris.
Chaker, S.
1978/79 Quelques réflexions générales et méthodo-logiques sur le déchiffrement du Libyque. *Libyca* Vol. XXVI-XXVII. Centre de Recherches Anthropologiques, Préhistoriques et Ethnographiques. Algiers, 149-155.
1984 Textes en linguistique berbère. Paris, 247-258
2003 Variété des usages Libyques. Variations chronologiques, géographiques et sociales. *Antiquités africaines*, Vol. 38-39, 2002-2003, 267-273.

Chaker, S.; Hachi, S.
2000 A propos de l'origine et de l'âge de l'écriture libyco-berbère. Réflexions du linguiste et du préhistorien. *Etudes Berbère et Chamito-sémitique*. Mélanges offerts à K.G.Prasse. Paris, 95-111.
Cohen, M.
1958 La grande invention de l'écriture et son évolution. Paris.
Cornelius, J.T.
1954 The Dravidian question. *Tamil Culture* 3/2, 92-102.
Daniels Ch., (1975): An ancient people of the Libyan Sahara. *Hamito-Semitica 1975*, 249-265.
Delgado, A.
1964 Inscripciones líbicas de Canarias. La Laguna.
Diamond, J.
2000 Arm und reich. Die Schicksale menschlicher Gesellschaften. Frankfurt am Main.
Drouin, J.
1991 Inscriptions et représentations rupestres saharo-sahéliennes: Problèmes de typologie graphique et d'interférences. *Bulletin de la Société méridionale de spéléologie et de préhistoire* XXXI, 89-97.
1994 Ecritures libyco-berbères. *Advances in handwriting and drawing: a multidisciplinary approach*. Paris. 568-577.
1996 Déchiffrer n'est pas traduire. *Lettre du RILB*, No. 2, 2-3.
1997 Segmentation, vocalisation et polysémie. *Lettre du RILB*, No. 3, 2-3.
1998 Espace et orientations graphiques. *Lettre du RILB*, No. 4, 3.
1999 Réflexions autour d'une recherche épigraphique dans l'Adrar des Ifoghas. *Lettre du RILB*, No. 5, 3-4.
2001 Les pièges de la lecture des inscriptions libyco-berbères. *Cahiers de l'AARS*, No. 6, 7-9.
2003 Les incipit dans les inscriptions rupestres. *Lettre du RILB*, No. 9, 2-3.
Dupuy, C.
1991 Les gravures rupestres de l'Adrar des Iforas dans le contexte de l'art saharien : une contribution à l'histoire du peuplement pastoral en Afrique septentrionale du Néolithique à nos jours. Aix-en-Provence. Université de Provence. Thèse, 2 tomes.
Eddy, M.R.
1994 Towards a context for the Canary Island Guanches. *Sahara* 6, 115-120.

Fell, B.
1974a Distribution of Ancient Maori Inscriptions written in Maurian (Numidian) Script. *The Epigraphic Society Occasional Papers*, Vol. 1, No. 10, 1-4.
1974b The bilingual Latin-Maori stele of Fawasa, priest of the Oracle of Rono. *The Epigraphic Society Occasional Papers*, Vol. 1, No. 8, 1-4.
1974c The bilingual Latin-Maori stele of Kaiu from Thullium. *The Epigraphic Society Occasional Papers*, Vol. 1, No. 6, 1-6.
1974d The bilingual Latin-Maori stele of Rapa from Thullium. *The Epigraphic Society Occasional Papers*, Vol. 1, No. 7, 1-5.
1974e The bilingual Latin-Maori stele of Weka from Bordj-Zoubia, Tunisia. *The Epigraphic Society Occasional Papers*, Vol. 1, No. 9, 1-4.
1974f The bilingual Latin-Maori stele of Zakatutu from Thullium. *The Epigraphic Society Occasional Papers*, Vol. 1, No. 11, 1-3.
Février, J.G.
1956 Que savons-nous du libyque? *Revue Africaine* C, 263-273.
1959 Histoire de l'écriture. Paris.
Flamand, G.-B.-M.
1921 Les pierres écrites (Hadjrat-Mektoubat). Gravures et Inscriptions Rupestres du Nord Africain. Paris.
Földes-Papp, K.
1966 Vom Felsbild zum Alphabet. Stuttgart.
Foucauld, P. de
1920 Notes pour servir a un essai grammaire Touarègue (Dialecte de l'Ahaggar). Algiers.
Friedrich, J.
1937 Schriftgeschichtliche Betrachtungen. *Zeitschrift der Deutschen Morgenländischen Gesellschaft*. Vol. 91, reprint 1966, 319-342.
1966 Die libyschen Schriften. In: Geschichte der Schrift. Heidelberg, 94-95.
Friedrich, J.; Röllig, W.
1970 Phönizisch-Punische Grammatik. Rome.
Frutiger, A.
1978 Der Mensch und seine Zeichen. Schriften, Symbole, Signete, Signale. Paris.
Galand, L.
1966 Inscriptions libyques. In: *Inscriptions antiques du Maroc*. Paris, 1-75.

Galand.L., (cont.)
1972 A propos d'une comparaison entre écritures libyco-berbère et méroitique. *Meroitic Newsletter* 9, 6-8.
1975 L'épigraphie libyco-berbères. *Colloque du XXIX congrès international des orientalistes*, Paris.
1977 Inscriptions Berbères du Sahara Occidental. *Almogaren* VII/1976. Hallein, 75-79.
1988 The problem of the Libyan alphabets in ancient North Africa. *Sahara Studien*, Hallein, 59-64.
1989a Inscriptions sahariennes. S*ahara* 2/89, Segrate (Milano), 109-110.
1989b Les alphabets libyques. *Antiquités africaines*, Vol. 25, 69-81.
1991 Entre l'oral et l'ecrit: le berbère. *Phoinikeia Grammata*. Namur, 703-715.
1993 Petit lexique pour l'étude des inscriptions libyco-berbères. *Almogaren* XXIII, Hallein, 119-126.
1996a Du berbère au libyque: une remontée difficile. *L'Alies* 16, Paris, 77-98.
1996b Le piège des consonnes tendues. *Lettre du RILB*, No. 2, 1.
1997a Graphie et phonie. Les caractères à valeur biconsonantique.- *Lettre du RILB*, No. 3, 1-2.
1997b Inscriptions Libyques du Constantinois (Fonds H.-G. Pflaum). *Antiquités Africaines*, Vol. 33, 49-65.
1998a La „mise en page" des inscriptions libyques. *Lettre du RILB*, No. 4, 1.
1998b Note d'information: l'écriture libyco-berbère. *Comptes rendus de l'Académie des Inscriptions et Belles Lettres,* No. II, 593-601.
1999a Lettres au Marabout. Paris.
1999b L'écriture libyco-berbère. *Sahara* 11, Segrate, 143-145.
1999c Nouvelles inscriptions libyques. *Lettre du RILB*, No. 5, 1-2.
2000 L'écriture libyco-berbère et l'Égypt. *Lettre du RILB*. No. 6, 1.
2001a Inscriptions libyques inédites ou revues (dossier J. Marcillet-Jaubert). In: *Vbiqve amici*. Mélanges offerts à Jean-Marie Lassère, 55-65.
2001b Note sur des inscriptions de Libye. *Cahiers de l'AARS*, No. 6, 3-5.
2001c Un vieux débat: l'origine de l'écriture libyco-berbère. *Lettre de l'AARS*. No. 20. St. Lizier, 21-24.
2003 À propos d'une nouvelle inscription de Dougga. *Lettre du RILB*, No. 9, 1.
2004 Les traits et les points. *Lettre du RILB*, No. 10, 1-2.

Galand.L., (cont.)
2005 Interrogations sur le Libyque. *Antiquités africaines*, Vol. 38-39:259-266.
Galand, L.; Sznycer, M.
1970 Une nouvelle inscription punico-libyque de Lixus. *Semitica* XX. Paris, 4-16.
Galand-Pernet, P.
1988 Die traditionellen arabischen Berberschriften in Marokko. *Sahara Studien*. Hallein, 65-79.
Garbini, G.
1966 Note libiche. *Studi magrebini*, Vol. 1, 81-90.
Gattefosse, R.M.
1934 Métaphysique préhistorique. *Bulletin de le Société de Préhistoire du Maroc*. Nr. 1-2, 1.2. trim.
Gauthier, Y.& Chr.
1996 L'art du Sahara. Paris, 139 p.
2003 Quelques exemples récents d'utilisation des Tifinagh en Immidir (Algérie) et remarques sur des caractères dit « sahariens ». *Cahiers de l'AARS*. No. 8, 33-40.
Ghaki, M.
1986 Une nouvelle inscription Libyque a Sicca Veneria (Le Kef): Libyque « oriental » et Libyque « occidental ». *Reppal* II, 315-320.
1991 Nouveaux textes libyques de Tunisie. *Reppal* VI, 87-94.
Glory, A.; Allain, Ch.; Reine, M.
1952 Les gravures libyco-berbères du Haut-Draa. *Actes de IIe Congrès Panafricain de Préhistoire*, Algiers, 715-722.
Goodchild, R.G.
1950 The Latino-Libyan inscriptions of Tripolitania. *The Antiquaries Journal*, XXX, 135-144.
Haarmann, H.
1990 Universalgeschichte der Schrift. Frankfurt/New York.
Hachid, M.
1992 El-Hadjra el-Mektouba. Les Pierres écrites de l'Atlas saharien. (2 vol.) Algiers.
2000 Les premiers Berbères. Entre Méditerranée, Tassili et Nil. Aix-en Provence, 173-190.
2004 De « l'association » des inscriptions rupestres à leur contexte iconographique. *Cahiers de l'AARS*. No. 9, 19-29.

Halévy, M.J.
1874 Essai d'épigraphie libyque. *Journal Asiatique*. 7th series, Vol. III, Feb.-March 1874, 73-203.
Harding King, M.W.J.
1903 A search for the Masked Tawareks, London.
Heckendorf, R.; Salih, A.
1999 Les peintures rupestres au Maroc: État des connaissances. *Beiträge zur allgemeinen und vergleichenden Archäologie*. Vol 19. Mainz, 233-257.
Hernández Pérez, M.S.
2002 El Julan. *Estudios prehispánicos* 10. Dirección General de Patrimonio Histórico.
Higounnet, Ch.
1986 L'écriture. Que sais-je? *PUF*, Paris, 47-60.
Iliffe, J.
1997 Geschichte Afrikas, München.
Jensen, H.
1958 Die Schrift in Vergangenheit und Gegenwart. Berlin.
Jodin, A.
1966 Une inscription libyque sur une amphore néo-punique de Banasa. *Bulletin d'Archéologie Marocaine*, Vol. VI, 493-498.
Kaache, B.
2002 À propos d'une inscription libyco-berbère du site de Boukerkour (Sud-est marocain). *Sahara* 13. Segrate, 166-167.
Kelley, D.H.
1994 The identification of the Proto-Tifinagh script at Peterborough, Ontario. *NEARA-Journal*, Vol. 28, No. 3-4, 86.
Kippenhahn, R.
1997 Verschlüsselte Botschaften. Geheimschrift, Enigma und Chipkarte. Hamburg.
Knauer, D.
1990 Schalensteine als Schriftträger. Published by the author. Karlsruhe, 231-233.
Kossmann, M.
1999 Essai sur la phonologie du proto-berbère. Cologne.
Lafuente, G.A.
1957 Le rôle du signe M dans les inscriptions libyques. *Revue Africaine*, 388-392.
Lemaire, A. ; Negro, G.
2000 Inscription aramèenne dans l'abri du Wadi Sura et nord-arabique à l'oasis de Baharieh (Égypte)? *Sahara*12. Segrate, 170-174.

Le Quellec, J.-L.
1987 L'art rupestre du Fezzan septentrional (Libye). *Cambridge Monographs in African Archaeology* 22, BAR International Series 365.
Lesven, R.; Mercier, A.
1928 La Pierre d'Ain Djemaa. *Bulletin de la Société de Préhistoire du Maroc*. No. 1-2, 1st et 2nd section, 1-6.
Letan, R.
2003 Protohistoire de la Vallée du Draa. Métallurgie du cuivre dans l'Anti-Atlas. Casablanca. Published by the author.
Levi della Vida, G.
1963 Sulle iscrizioni "Latino-Libiche" della Tripolitania. *Oriens Antiquus* 1963, Rome, 65-95.
Lidzbarski, M.
1902 Altnordarabisches II. Ephemeris für semitische Epigraphik I. Gießen.
1913 Eine punisch-altberberische Bilinguis aus einem Tempel des Massinissa. *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften,* Vol. 1/1913. Berlin, 296-305.
Littmann, E.
1904 L'origine de l'alphabet libyen. *Journal Asiatique* II. Nov.-Dec. 1904, 423-440.
Lutz, R. und G.
1995 Das Geheimnis der Wüste. Innsbruck.
Macdonald, M.C.A.
2000 Reflections on the linguistic map of pre-Islamic Arabia. *Arabian archaeology and epigraphy* 11, 28-79.
Malhomme, J.; Galand, L.
1960 L'homme a l'inscription des Azib n'Ikkis: Yagour. *Notes et documents, Extrait du Bulletin d'Archéologie Marocaine*, Vol. IV, 411-421.
Malhomme, J. (1961) : Corpus des gravures rupestres du Grand Atlas (2e partie). *Publications du Service des Antiquités du Maroc*. No. 14. Rabat.
Marcy, G.
1936 L'épigraphie berbère. *Annales de l'institut d'études orientales de l'Université d'Alger* 2, 128-164.
Mauny, R.
1954 Gravures, peintures et inscriptions rupestres de l'Ouest Africain. Inst. Français d'Afrique Noire. Dakar.

Meinhof, C.
1931 Die libyschen Inschriften. *Abhandlungen für die Kunde des Morgenlandes*, Vol. XIX, No. 1, Leipzig, 1-46.
Meunie, J.; Allain, Ch.
1956 Quelques gravures et monuments funéraires de l'extrême Sud-Est marocain. *Hespéris.* Vol. XLIII. Paris, 51-85.
Monod, Th.
1938 Contributions à l'étude du Sahara Occidental. Paris.
Muess, J.
1989 Das römische Alphabet. München.
Mukarovsky, H.G.
1981 Zur Herkunft der Tifinagh-Schrift. In: Trost*: Die Felsbilder des Zentralen Ahaggar*. Graz, 36-38..
Muzzolini, A.
1995 Les images rupestres du Sahara. Toulouse.
2001 Au sujet de l'origine de l'écriture libyque. *Lettre de l'AARS.* No. 19. St. Lizier, 23-26.
Navarro, M.G. et al.
2003 Nueva estación de grabados rupestres localizada en la necrópolis de Arteara, San Bartolomé de Tirajana, Gran Canaria. *Tabona* 12. La Laguna, 119-136.
Negro, G.
2001/02 Some « Cabalistic » inscriptions around the Great Pyramid's original entrance. Dating the most ancient Libyco-Berber inscriptions. *Sahara* 13, 148-165.
Negro, G. ; Pichler, W.
2005 The Libyc-Berber inscriptions in the Selima Oasis. *Sahara* 16. Segrate, 173-178.
Newbold, D.
1928 Rock-pictures and Archaeology in the Libyan Desert. *Antiquity* 2, (7) 261-291.
O'Connor, M.
1996 The Berber scripts. In: *Daniels; Bright: The World's Writing Systems*. Oxford, 112-116.
Oulamara, A.; Duvernoy, J.
1988 An application of the Gough transform to automatic recognition of Berber characters. *Signal Processing* 14, 79-90.
Pellicer Catalán, M. et al.
1974 Aportaciones al estudio del arte rupestre del Sahara Español (zona meridional). *Tabona* 2. La Laguna.

Pichler, W.
1993 Die Schrift der Ostinseln - Corpus der Inschriften auf Fuerteventura. *Almogaren* XXIII, Hallein, 313 – 453.
1995 Neue Ostinsel-Inschriften (latino-kanarische Inschriften) auf Fuerteventura. *Almogaren* XXVI, Hallein, 21-46.
1996 Libysch-berberische Inschriften auf Fuerteventura. *Almogaren* XXVII, Vöcklabruck, 7-83.
1999a Die libysch-berberischen Inschriften am Eingang der Cueva del Agua/El Hierro. *Almogaren* XXX, Vöcklabruck, 221-228.
1999b The first Libyco-Berber inscriptions of the Anti-Atlas. *Sahara* 11. Segrate/Italy, 146-147.
2000a The Libyco-Berber inscriptions of Foum Chenna (Morocco). *Sahara* 12. Segrate/Italy, 176-178.
2000b Essai de systématique de l'écriture libyco-berbère. *Comptes rendus du Groupe linguistique d'études Chamito-sémitique*. Vol. XXXIII (1995–1998). Paris, 131-139.
2000c Die Felsbilder von Foum Chenna/Oued Draa (Marokko): Ein Spiegel der nordsaharischen Berberkultur im 1. Jahrtausend BC. *Almogaren* XXXI, 117-124, Vienna.
2000d The Libyco-Berber inscriptions of Foum Chenna/Morocco. *Sahara* 12, Segrate, 176-178.
2002 Taouz/Morocco re-examined. Ithyphalliques, Traditions orales, Monuments lithiques et Art rupestre au Sahara. Hommages à Henri Lhote. *Cahiers de l'AARS*. St. Lizier, 197-202.
2003 Las inscripciones rupestres de Fuerteventura. Cabildo de Fuerteventura. Puerto del Rosario 2003.
2004 Geritzte libysch-berberische Inschriften auf El Hierro. *IC-Nachrichten* Nr. 86, Vienna, 41-43.
2005a The Libyco-Berber inscriptions of the Canary Islands – misused as a playground for specialists and amateurs. *Lettre de l'AARS*, No. 28, 4-5.
2005b "Mütterchen, der Barranco brennt!" – wie aus einem Alphabet eine Inschrift wird. *IC-Nachrichten* Nr. 87, Vienna, 41-45.
2006 The Libyco-Berber inscriptions of Aourdaoum/ Algeria. In: Y. Gauthier, J.-L. Le Quellec, R. Simonis [eds], 2006, Hic sunt Leones, Mélanges sahariens en l'honneur d'Alfred Muzzolini, *Cahiers de l'AARS*, 10, 171-176.
Pichler, W.; Rodrigue, A.
2000 The wall of discs at Msemrir/Vallée du Dadès (Morocco). *Anthropologie* XXXVIII/2, 201-203, Brno.

Pichler, W.; Rodrigue, A. (cont.)
2001 Libyco-Berber inscriptions at Oued Meskaou/Morocco. *Cahiers de l'AARS*, No. 6, 23-24.
2002 New Libyco-Berber inscriptions at Taouz/Southern Morocco. *Lettre de l'AARS*, 1/2002, No. 21. St. Lizier, 13-14.
2003 Some Libyco-Berber inscriptions in Southern Morocco. *Cahiers de l'AARS*, No. 8, 23-24.
Poyto, R.; Musso, J.C.
1969 Corpus des peintures et gravures rupestres de Grande Kabylie. *Mémoires du Centre de Recherches Anthropologiques, Préhistoriques et Ethnographiques* XI, Paris.
Prasse, K.-G.
1972 Manuel de grammaire Touaregue. (3 vol.) Copenhagen.
Rando, J.C.
1999 Ricardo Peytaví: Los guanches tienen origin norteafricano. *Diario de Avisos* 4.3.1999, 21.
Rebuffat, R.
1974-75 Graffiti en "Libyque de Bu Njem". *Libya Antiqua* Vol XI-XII, 165-187.
Reynolds, J.M.; Ward Perkins, J.B.
1952 The inscriptions of Roman Tripolitania. Rome–London.
Reynolds J.M.; Brogan O.; Smith D.
1958 Inscriptions in the Libyan Alphabet from Ghirza in Tripolitania. *Antiquity* XXXII, 112-115.
Rodrigue, A.
1987 Une frise d'éléphants inédite dans l'Atlas marocain. *Bulletin de la Société d'Etudes et de Recherches Préhistorique*, No. 36, Les Eyzies, 43-44.
1989 Gravures rupestres inédites dans le Dadès. *Bulletin du Club Alpin Français de Casablanca*, 24-26.
1991 Gravures inédites d'éléphants dans l'Atlas Marocain. *Cahiers Ligures de Préhistoire et de Protohistoire*. No. 3, 179-191.
1999 L'Art rupestre du Haut Atlas marocain. Paris.
2000 Préhistoire du Maroc. Casablanca.
2001 Note sur des inscriptions gravées inédites. *L'Ouest Saharien*, 3rd ed., 23-25.
Rodrigue, A.; Pichler, W.
2002 New Libyco-Berber inscriptions at Taouz/Southern Morocco. *Lettre de l'AARS*, 1/2002, No. 21, St. Lizier, 13-14.

Rössler, O.
1958 Die Sprache Numidiens. *Sybaris*, Wiesbaden, 94-120.
1979 Die Numider. In: *Die Numider*. Reiter und Könige nördlich der Sahara. Bonn, 90-95.
Salama, P.
1993 À propos d'une inscription Libyque du Musée des Antiquités d'Alger. Drouin, J ; Roth, A. (ed.) : *À la croisée des Études Libyco-Berbères*. Paris, 127-140.
Sass, B.
1991 On the Origin and Early History of the Northwest Semitic, South Semitic and Greek Alphabets. *Studia Alphabetica. Orbis Biblicus Orientalis* 102. Freiburg-Göttingen.
Saulcy, F. de
1843 Lettre sur l'inscription bilingue de Thougga. *Journal Asiatique*, 4th series, Vol.1, 85-126.
1849 Observations sur l'alphabet tifinagh. *Journal Asiatique*, 4th series, Vol. XIII, Mars 1849, 247-264.
Simoneau, A.
1972 Les cavaliers du Haut Draa. *Bulletin d'Archéologie Marocain*, Vol. VIII (1968/72), 27-36.
Skounti, A.; Lemjidi, A.; Nami, M.
2003 Tirra. Aux origines de l'écriture au Maroc. Institut Royal de la Culture Amazighe. *Etudes et Recherches*, No. 1.
Skounti, A.; Nami, M.
2000 Une inscription rupestre libyco-berbère peinte d'Ifrane-n-Taska (Sud marocain). *Sahara* 12. Segrate/Italy, 174-175.
Slaouti Taklit, M.
2004 L'alphabet Latin serait-il d'origine berbère? Paris.
Soleilhavoup, F.
1988 Découvertes archéologiques exceptionnelles au sud de l'Ahaggar. *Sahara* 1. Segrate, 49-71.
1990 Nouvelles stations rupestres à l'Ouest de l'Ahaggar. *Sahara* 3. Segrate, 71-82.
Springer Bunk, R.
1998 Los grabados del Ksar Barebi (Taghit, Argelia). *Almogaren* XXIX, Vöcklabruck, 85-101.
2001 Origen y uso de la escritura líbico-bereber en Canarias. Centro de la Cultura Popular Canaria, Tenerife/Gran Canaria.
2002 Consideraciones sobre las clasificaciones de la escritura Libico-Bereber: El ejemplo de una estacion rupestre (Rocher des Pigeons). *Actas del I. Simposio de Manifestaciones Rupestres*

Canarias-Norte de Africa. Las Palmas de Gran Canaria (17 – 23 de abril de 1995). CD-ROM. Faykag Número Extraordinario Otoño 2002, 379-391.

Springer Bunk, R.A.; Perera Betancor, M-A.; Cejudo Betancor, M.
1998 Las inscripciones líbico-bereberes de Marruecos. Agadir, 165-178.

Steiner, H.-E.
1998 „Los Signos über der Punta de los Saltos. Neue Felsbildstätte bei La Restinga auf El Hierro. *Almogaren* XXIX/1998, 133-172.

Steiner, H.-E.
2002 Altkanarische Stätten in Las Playas/El Hierro I. „Cueva de Letime“ bzw. „Cueva del Agua“ Höhlenheiligtum oder Zufluchtsort. *Almogaren* XXXII-XXXIII, Vienna, 329-398.

Striedter, K.H.
1984 Felsbilder der Sahara. Frankfurt.

Tamazγa – Nordafrika : Nordafrika e.V. Tübingen.

Tovar, A.
1944/45 Papeletas de epigrafía líbica. *Boletín del Seminario de Estudios de Arte y Arqueología*. Valladolid, 69-80.

Trost, F.
1981 Die Felsbilder des zentralen Ahaggar. Graz.

Ulbrich, H.J.
1991 Felsbildforschung auf Lanzarote. *Almogaren* XXI/2/1990, Hallein.
1994 Neue Felsbildstationen auf der Kanareninsel Lanzarote (I). *Almogaren* XXIV-XXV/1993-94, Hallein, 75-112.
1996 Neue Felsbildstationen auf der Kanareninsel Lanzarote (II). *Almogaren* XXVII/1996, Hallein, 285-357.
1998 Neue Felsbildstationen auf der Kanareninsel Lanzarote (III). *Almogaren* XXIX/1998, Vöcklabruck, 103-132.
2002 Eine bedeutende Felsbild-Fundstelle auf Lanzarote (Kanarische Inseln): Argana Alta bei Arrecife. *Almogaren* XXXII-XXXIII/2001-2002, Vienna, 251-274.
2004 Transkulturelle Schriftvariationen in den prähispanischen Felsbildern Lanzarotes (Kanarische Inseln). *IC-Nachrichten* No. 86, Juli 2004, 35-40.

Untermann, J.
1997 Neue Überlegungen und eine neue Quelle zur Entstehung der althispanischen Schriften. *Madrider Mitteilungen* 38. Mainz, 49-66.

Winters, C.A.
1983 The Ancient Manding Script. *Blacks in Science: Ancient and Modern*. New Brunswick: Transaction Books, 208-214.

Zawadowsky, Y.
1971 Notule sur une possible contamination de l'alphabet méroitique par le système d'écriture libyco-berbère. *Meroitic Newsletter* 7, 11-12.
1972 A propos de l' « à propos » de M. Galand. Et suite de ma « notule » sur l'écriture méroitique. *Meroitic Newsletter* 9, 9-13.